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Account of a visit to the Jugloo and Seesee rivers in Upper Assam, by Capt. E. T. Dalton, *together with a note on the Gold Fields of that Province, by Major* Hannay.

I received instructions, in November last, to examine and report on the Gold-producing capabilities of an auriferous stream, an affluent of the Booree Dihing, called the Jugloo. This stream takes its rise in the Tipam range of hills in this District (Luckimpore) in about 27° 20′ North Latitude and 95° 30′ East Longitude, flows through an uninhabited tract of high undulating forest-land between the hills and Dihing river, into which the Jugloo discharges itself fourteen miles above Jaipore after a course of about ten miles.

This Jugloo, or the tract through which it flows, was, in olden times from the richness of the metal found there, considered a royal preserve as a gold-field. There is a tradition that in some part of it, gold was found in lumps attached to an edible root accidentally pulled up by a fortunate traveller; but the exact site of this discovery is not now known.

In modern times, it has been quite deserted by the professional gold-washers, because they say that it costs more to propitiate the spirits who guard over the mineral treasures of the stream, than they can afford to pay. Fortunately these spirits are said never to molest Europeans, so without considering the propitiatory offering necessary as a preliminary, I proceeded to the field accompanied by an expert gold-washer who, as a slave in a Singphoo family, had

practised the vocation in the Northern Provinces of Burmah, and a few men with kodals, pick-axes and shovels.

After about an hour's walk from the Dihing up the stream of the Jugloo, when we first came on pebbles, we commenced washing in a rough wooden pan made for the occasion. The very first attempt gave a few minute specks of rather pale gold; we continued washing at intervals as we advanced, and every panful of gravel was found to contain a few of these spangles. At a point which seemed favourable for the purpose, we turned a portion of the stream and made a hole three feet in its bed. The washings from this depth decidedly gave a greater number of spangles and of a richer colour, than those we had obtained from the surface washings. Rising from a part of the stream the section of a hill about fifty feet in height, of coarse reddish sandstone, was left bare and perpendicular by a land slip. This contained a stratum of gravel about fifteen feet *above the highest* water-mark, some of which I caused to be washed, and it too was found to contain gold, indicating that the presence of that metal was not confined to spots acted on by the waters of the Jugloo; sand and gravel taken from occasional water-courses leading to the Jugloo were washed with the same result.

Retracing our steps we proceeded up another branch of the Jugloo, and were joined by a party of gold-washers deputed by me to obtain specimens, who took us to the scene of their operations about half a mile from the junction of the two rivers. They had been working two pans and, to assist the operation, they had constructed two small embankments with bamboos and rubbish which divided the stream into three channels and enabled them to turn all the water into or out of the central channel. Their practice is to collect with small wooden scrapers a heap of gravel at the lower end of their central channel; upon this they cause the stream to play, and with sieves made of bamboo they sift the heap and throw aside the pebbles.

The stream carries off the lighter particles of the sand thus disturbed. Pansful of the residue, which consists entirely of mineral fragments, are then taken up and washed in the usual manner with results far more satisfactory, than when the gravel is washed in the pan without being subjected to this preliminary process.

Proceeding up this stream I found it had in many places cut for itself little ravines showing sections of hills formed of deposits of grey and red coarse sand of sufficient consistency to form upright cliffs, though crumbling when handled, with beds of gravel intervening, which also occur in tolerably consistent masses approaching to a conglomerate; these lay in strata inclined at an angle of forty-five or thereabouts. I obtained washings from them all, and found gold dust in the red sand and gravel strata always, but not always in the blue sand which owed its colour to a mixture of blue clay slate silt.

It follows from the above that gold is not confined to the bed of the stream, it is disseminated throughout the tract through which the stream flows, and the only question is whether it is found in sufficient quantities to render washing for it a profitable speculation.

The mere surface experiments as yet made are not a sufficient test; the deposit should be thoroughly examined to its base before its value can be determined.

Of the comparative richness of the Jugloo tract, so far as it has been examined I can only judge from the quantity of gold dust obtained in my own desultory operations.

I made a rough estimate of the quantity of rubble washed, and on comparing it with the gold obtained, it gave about 18 grains to the ton and about 8 grains as the out-turn of one man's labour for the day.

Subsequently I had an opportunity of more accurately testing the produce of a gold-washer's daily work in a different field.

After I had left the Jugloo, Major Hannay proceeded with the examination of the auriferous deposits in that vicinity and about Jaipore, and, as will be seen from his paper on the subject, has satisfactorily established, that it is of great extent, flanking the whole of the Naga range of hills from the Noa Dihing to the Dhunsiri river. We subsequently proceeded together to examine the gold-producing sands of the Seesee river on the North bank of the Brahmapooter; we took gold-washers with us and found a party of the Seesee ryots at work just under the hill.

Within an easy march of their own villages, they annually find here lucrative occupation for the months of the year when an excursion of the kind is most enjoyable, and when they have most leisure

from their agricultural pursuits to give to it. After "harvest home" in January, they form parties and start with provisions for a week or a fortnight, and in a very short time, if they are fortunate, they may obtain sufficient gold to pay their revenue. They wash in troughs called "doorunis," a process which has been already described in former numbers of the Journal.*

In favourable localities, 20 grains of gold is not an unusual return to one day's labour with a dooruni worked by three men, who between them dig up, remove and wash in a day on an average about one ton of rubble. In the operations conducted in our presence, the yield of one dooruni, which was made over to me, was only 11 grains, from 1 ton, 2 cwt. and 36 lbs. of rubble, but this was pronounced by the gold-washers to be very unfavourable.

The average may be estimated for the Seesee at 15 grains to 1 ton of earth. This in Siberia would not be considered worth working, but to an Assamese, it is very good return for an employment which is not very laborious and is decidedly interesting. To prove this, it is only necessary to observe the excited and gratified looks of the party as they collect round the dooruni at that period of the operation, when the gold is displayed as a bright fringe bordering the upper portion of the fine black sand, to which the operator has reduced the rubble, he has been working in.

The annual yield of the Seesee is said to be about half a seer. Judging in this way, the most valuable rivers are the Subanshiri and Dibong, whose yield annually is from a seer and a half to two seers of pure gold.

The Brahmapooter and Dibong are said to give each from half a seer to three quarters; the numerous smaller rivers in Luckimpore are variously stated at from a quarter to half a seer, the total annual yield of the district being about ten seers. Each river is worked by the gold-washers who live nearest to it. But, few are now employed in the occupation in comparison to the numbers that engaged in it when Assam was under a native government. The whole of the Khéle or tribe of gold-washers were then obliged to follow that profession, as they were under the necessity of paying their contribution towards the expenses of the state in pure gold.

* Vide Journal Vol. VII. p. 621.—Eds.

Notes on the Gold Fields of Assam.—By Major Hannay.

Although it is well authenticated that the produce of the gold-washings in Assam, particularly Upper Assam, formed a very considerable source of revenue to the Assam Government of former days, no correct data can be obtained so as to give an idea of the exact amount of gold realized yearly:—but, as the Sonwals, or gold-washers, one of the constituted Khéle or sections of the inhabitants (according to occupation) who paid their taxes in gold, form a large portion of the population, we may reckon on its having been something considerable, when in the Northern district of Sudeah alone, including Luckimpore, these Sonwal paiks amounted to 10,000. Allowing, therefore, that every paik, at the lowest rate, supplied 4 annas weight of gold-dust yearly, the total amount would be 40,000 grs. for that district alone, and as the same system of gold-washing obtained in the districts of the South bank of the Brahmapooter, as much more may have been there realized, and it may not be perhaps beyond the mark, to note the yearly produce of gold-washing in Assam, in former times, as amounting to 8, or 10,000£ sterling.

In the short account of Assam given at the end of Vol. III. of Montgomery Martin's "Sketches of Eastern India," in enumerating the rivers on the North bank of the Brahmapooter, the whole of them are said to contain gold in their sands, and the Subanshiri, Dikrung, Boopani, Booragong, and Boargon, rivers of the Luckimpore and Kullungpore districts, are noted each as to the quality and quantity of their gold; but other small rivers in the Luckimpore district—the more prolific sources of the Dihong, the Dibong, or the Brahmapooter—are not alluded to, neither is the Dihing or any one river on the South bank mentioned; which shows, that the information relative to the extent of the Gold fields, was imperfect. Chap. III., however, of the same notice, under head "Commerce of Assam," states, that the Assam Government received into the Royal Treasury 1,500 grs. *weight* of gold yearly, from a gold mine called Pakerguri, situated at the confluence of the Dhunsiri river with the Brahmapooter. The Pakerguri is a small river rising in the Rengma mountains joining the Dhunsiri, a day's journey within its con-

fluence with the Brahmapooter. I cannot vouch for the correctness of the statement given regarding the gold *mine*, but this small river is known in its upper course, to be a prolific gold stream in the present day. It is stated also, that the imports at Goalparah from Bengal in 1808-9 amounting to two and a quarter lacks of rupees, paid in gold from these resources, and in silver. A good deal has been already written on the gold statistics of Assam, as they are known in modern times ; (Vide vol. VII. p. 625) and little more can be said beyond the personal knowledge which has been obtained of the wide extent of the existence of the precious metal ; and that in some of the districts in North East Assam, it is now a profitable source of payment of revenue to the Sonwal ryots ; the Luckimpore and Suddeah districts produced in 1851-52, ten seers of pure gold. The selling rate to the Ryah traders being from 14 to 15 Rs. per tolah of solid gold prepared by melting with quicksilver.

The geological features of Assam are decidedly in favour of its being a Gold field. The valley, like others in Northern Burmah and North West China, abuts upon a portion of Tartary in which, from Longitude 96° Eastward, in a distance of a hundred miles, several large and magnificent rivers, having their sources in Eastern central Tartary, burst through the great Southern mountain barrier, finding their way to the ocean in a direction not far varying from the cardinal points North and South, thus forming valleys and mountain ranges running in the same direction.

Several of these mountain ranges are known to be very rich in minerals, particularly in Northern Laos, and in the range called, by the Chinese, Ootai Shan, or Great Black Mountains, which forms the boundary between China and Burmah, can be enumerated gold, iron and salt in the Northern portion—silver, iron and precious stones in the central, and further on, antimony, iron and tin. This range also evidently passes through the Malayan Peninsula ; and in its most Southern limits, we have again gold and tin. Indeed, as a geographical and statistical fact, it may be safely stated that in this line of mountains, we ought to recognize the true Aurea Chersonesus of the ancients, as well as their Auria Regio and Argentea Regio.

Other tracts in Burmah are also rich in valuable minerals ; its white marble and noble serpentine, are perhaps unequalled. The Ir-

rawaddy itself, in its higher course, abounds in rocks of beautiful workable serpentine of varied colours. There is every appearance of the existence of copper interspersed amongst these rocks: and most of the affluents of the Irrawaddy like the tributary rivers of the Brahmapooter abound in gold: but the most prolific sources of this metal appear to be well to the North, where the mountain torrents have a short and turbulent course to the main river.

In the Hookong valley, the tributaries of the Kyondwen are prolific in gold, and two of the rivers, Kapdhoop and Nam Tibee, are noted for the size of the scales (pepitas), which are described as varying from the size of a pumpkin seed to a four-anna piece, and, from what I have myself seen, I do not doubt it. Most, if not all of this gold goes to China, where it is beaten into gold-leaf and subsequently finds its way to Burmah to be used in the gilding of the Kyoungs (monasteries) and temples.

In Assam, in the lower and central portion of the valley, the rocks visible and in situ, are granite, gneiss, and a coarse sandstone and quartz rock. In the line of the Brahmapooter river these disappear on the North or right bank after leaving the high table-land at Bishnath; on the South bank the Dhunsiri river, which runs but at some distance along the Eastern flank of the Rengma mountains, may be said to be its limit here. The granite rocks which come very close upon the Dhunsiri at the Nambar falls, are succeeded by shell and other limestone of an uniform fawn colour, and in the same vicinity are hot sulphureous springs, and numerous salzes, containing sulphurates of iron and salt. Succeeding the Rengma range also, we have a low hilly and undulating country with deep dells and rice pathars, extending Eastward across the valley to the great Naga range, and throughout this tract, there are extensive hard ferruginous deposits, some of which crop out in the bed of the Dhunsiri. In the banks of that river also, as well as throughout a considerable tract of country to the East, including Basah Doyang, the plastic clay at some depth under the surface contains an oxide of iron in grains, which is extensively smelted for its iron.

The great Naga range in the interior, as far as I have seen it, East of the Dikho, is clay slate, which in some of the hills imbeds nodules of a compact clay iron ore; in other parts also a coarse sand-

stone crops out, as well as a hard heavy homogeneous blue-coloured rock with white quartz veins. Tufaceous limestone has also been discovered both in the clay slate, and in the last named rock. In the steep banks of the rivers of this section of the Naga range, so soon as the clay slate commences, there are numerous brine springs, many of which have been open from time immemorial, and others are being constantly dug out. The shafts are from twelve to thirty feet deep, and always dug in the clay slate, but no workable brine is found, until boulders are reached of the blue-coloured rock above-mentioned, which from its hardness is called by the Nagas, Tan Loung. After leaving the true clay slate there is a tract of hilly ground, composed of small boulders of the foregoing rocks, with ferruginous deposits as hard as the metal itself. To this succeed the deposits of the lower range in which we find coal and carboniferous strata indications, and in all the small streams which pass through their tract gold is found in a rubble consisting of rolled pebbles of rocks, not however visible, granite, mica schist, quartz, jasper and lydian stone, with occasionally pieces of fossil wood. This rubble appears of great extent, and apparently flanks the whole of the Naga range from the Nao Dihing to the Dhunsiri.

In no part of the hill streams passing through the clay slate is a trace of gold to be found.

The black debris, dug from the brine springs, contain however much sulphuret of iron. The salzes also which are numerous towards the plains, throw up mud, sand and gravel, impregnated with sulphuret of iron. The gravel in some of them is consolidated to the consistency of rock, composed of minute particles of jasper, quartz and other igneous rocks: this appears stratified, but to what depth is unknown.

It may be worthy of notice also, that these salzes extend across the Upper Muttuck and shew in their vicinity the same gravel deposits. In the gravel of the Tepuck Jan, an affluent of the Dibroo river, in the North or right bank of that river, traces of gold have been found.

In the North East section of Assam, that is round from the Nao Dihing at the confluence of the Duffa Panee to the Dihong river, little is known of the nature of the rocks in situ, excepting at dis-

tant points. The constant landslips that are occurring, would make it difficult to say whether the masses of rock however large, which have been seen, were really in situ, or may not have been detached from their parent site ages ago. We find also large tracts of table-land lying along the edge of the North East mountains, based principally upon well rounded granite and other primitive rock boulders to which, from the apparent great age of the deposit, a source cannot be assigned. However, the rocks in situ which have been noted by Wilcox, in his journey from the Nao Dihing to Bot Khampti across the Great Duffa range, are conglomerate and coarse sandstone near the Dihing, and gneiss passing into mica slate, sienite and clay slate, on the high ridges. Inland from the Brama Koond in the line of the Brahmapooter and its tributaries in the Mishmee country also, granite, granite gneiss, sienitic granite, sienite, greenstone, serpentine, gneiss passing into mica slate, primitive limestone and hornblend rock;—primitive limestone of a bluish grey and white, seems to be a very common rock. I observed the rocks in the river below, and at the Brama Koond were a stratified heavy schistose rock passing into chlorate slate, and serpentine apparently. Between the Koond and the Degaroo river and its sources, Wilcox marks the rocks as limestone, and the boulders of this, which are annually brought down by the Degaroo, show the existence of this stratum. A dirty white primitive limestone associated with sandstone in large masses, is also visible near the gorge of the Dihong river. Most of the landslips appear to be a quartz or feltzpar rock of a reddish or greenish colour with veins of decomposing feltzpar interspersed, the powder of which from some of the scar appears to be kaolin.

In the beds of the rivers in the tract of country defined, we find the boulders composed of all the rocks before-mentioned, with many varieties, and the addition of trap, porphyry, basalt and white quartz. The last prevails in the bed of the Brahmapooter, the former in the Dihong and Debong. In two of the small tributaries of the Dihong, on the Assam side of the gorge, hard conglomerates and jasper rocks are in situ.

The mountainous region within the points here noted, and which encircle the head of the Assam valley, cannot be considered as a

continuation of the great Himálayah, though their height ranges from 7 to 8,000 feet, and at one point the Duffa Bhoom reaches to 14,500, and the Thigoroe, twenty miles North of the Brahmapooter at Saikwah, 11,000. These mountains are evidently the Udaya, or "mountains of the rising sun" of the Hindus. The true Himálayah appear to end in a direction nearly North of Dibrooghur in Latitude 28.40, or 29 probably—and from the gorge of the Dihong several hill ranges diverge to the S. W. and West: that which bounds the Assam plain is not more than sixteen miles distant from the Brahmapooter. The intervening country is a deposit of no great age, and has no doubt been formed by the Lohita or Dihong, which is known to have run under these hills. The small rivers passing through this tract have their sources a short distance within the hills, and are all auriferous in their pebbly beds. They are the Sillee, Deemo, Dirgemo, Seesee, and Dob. The rock strata of the hills are sedimentary—one, a coarse grit composed of granite debris—another finer and of a bluish colour containing sulphuret of iron—both appear to imbed lignites and fossil wood. The boulders in the rivers, besides those of the grits noticed, are of the older rocks, such as are found in the larger rivers to the East, with the exception of the serpentine. In and about the gorge of the Seesee, it was observed that the sedimentary rock rested on a stratum of rubble of these older rocks cemented together by a ferruginous sand containing gold. This sedimentary rock stratum is of great thickness within the hills, and a similar deposit is to be found along the line of hills further to the West: near the gorge of the Boroli Gunga in the Chardwar district, a tuffaceous limestone is in situ. Salzes also, similar to those on the South side of the valley, are very common, and it is an interesting geological fact, that, as the stratum on the Southern mountains is tilted up at an angle of 45° to the East, the sedimentary rock stratum of these hills is tilted up to the North West and West, and the stratum of the Brahma Koond to the North East.

The granites, primitive limestone and serpentine are highly metalliferous. Black magnetic oxide is to be found in the first and last named rock, and sulphuret of iron in the limestone. In the ore found in some of the serpentines there are traces of copper if not

of silver: and what is called the gold-washer's sand (the Schlich of the Bohemians) contains universally the different oxides of iron and other minerals, with minute crystals of quartz and precious stones.

In regard to the manipulation or washing of the auriferous sands according to the methods in use with different people in the East, after reading the description given in Lecture IV. of the "Lectures on Gold," delivered at the Museum of Practical Geology, it is evident that the principle adopted by gold-washers of all countries in the washing of auriferous rubble, and the object, that of washing out all useless matter, so as to leave nothing but the oxide of iron and its associated gold dust, is the same. The Chinese have a trough with cleets and transverse grooves. The Assamese generally wash in a trough and take the whole stuff in the rough, the finer sand, &c., being washed into the trough through a bamboo grating or sieve placed at the higher end, and although for want of cleets there is some loss, it is wonderful to see with what dexterity the left hand is used to keep the dust at the head of the trough, and to allow of a constant stream of water passing down its slope, thus washing the stuff thoroughly in a very short time and leaving nothing but the very finest of the *Schlich* with its gold dust. This trough might be improved, but as it is light, and one man can work it easily, being supplied with material by a boy, and one man to dig, it answers the purpose—and when gold is plentiful, this is the cheapest method of labour which could be employed in Assam. The oval board in use with the Singphoes appears to me, however, in dexterous hands to be equal to any trough—and provided the stuff could be given to the washer after having been passed through a sieve, I reckon this to be the best and cheapest method of extracting the gold dust—for not only does an expert gold-washer wash clean every particle of oxide and gold contained in a given quantity of rubble, but he will after the day's labour is over, take the Schlich and gold dust on the board, and by a peculiar dexterity of hand with the board and the water, wash away every particle of the former, leaving the latter at the head of the board with little necessity for quicksilver to lick it up, as generally done to prepare it for melting.

Dibrooghur, June, 1853.

Catalogue of Reptiles inhabiting the Peninsula of India.—By T. C. Jerdon, *Esq. Madras Medical Service.*

Continued from p. 479.

The following is merely a brief and imperfect resumé of the serpents and frogs of S. India, drawn up from my drawings, with a few rough notes attached to them; as circumstances have prevented my giving a more full account at this time; but a detailed account will be drawn up, as soon as I have again access to my collection.

OPHIDIA.

VENOMOUS SERPENTS.

Fam. VIPERIDÆ.

Sub-Fam. BUNGARINÆ.

Terrestrial.

Elaps melanurus, (Shaw)—Russell 1, pl. 8.

I never procured but one specimen of this little snake. It was at Jalnah and about 14 inches long. It was red beneath the tail and was very bold. Scutæ 234. Scutellæ 28. 13 rows of scales.*

Elaps malabaricus—n. s.

Head black with transverse bands, body brown above with black markings, bright red beneath. Scutæ 246. Scutellæ 38. 13 rows of scales. Tail exceeds $\frac{1}{10}$th of total length.

I have found this little snake in forest in Malabar, once or twice during the monsoon. The red colour of the abdomen fades in spirits.

Bungarus candidus—L., Russell 1, pl. 1.

B. semi-fasciatus, Schl. 'Yenna vyrien' of the Tamools. Up to 3 feet in length. Is very common all over Southern India, and is said to be fatal. Scutæ 217. Scutellæ 39.

This snake may be distinguished from one or two harmless species that much resemble it in colour, by the sub-caudal scutellæ being in one row, not double.

Bungarus fasciatus—Russell 1, pl. 3.

Golden banded bungarum.

I have only seen specimens of this handsome snake in the Northern Circars at Ganjam, where it is not very common. It is said to be very deadly.

* Common in Burma.—*Cur. As. Soc.*

Sub-Fam. NAJINÆ.—Bon.

HAMADRYAS OPHIOPHAGUS—Cantor ?

NAIA VITTATA—Elliot ?

I once had a magnificent snake of this genus sent me, which had been killed in forest in the Wyraad. It was 12½ feet long. Scutæ 225. Sub-caudal do. 12. Scutellæ 64.

I am inclined to think that it may be a different species from the Bengal serpent, for it was of an uniform dark olive colour above, without any appearance of bands. The specimen was unfortunately destroyed.*

NAÍA LUTESCENS—Russ. 1, pl. 6. Cobra.

NAGA PAMBU, or NELLA PAMBU—Tam. But too common all over India.

Sub-Fam. VIPERINÆ,—Bon.

TRIGONOCEPHALUS NEPA—Laur.

COPHIAS HYPNALE—Morrem.

Scutæ 142. Scutellæ 39. 17 rows of scales. Not uncommon in forests in Malabar. I have not seen it longer than 16 or 17 inches.

TRIGONOCEPHALUS ELLIOTTI—n. s.

Form massive; 23 rows of scales on the body; Scutæ 151, Scutellæ 43. Olive-green above; pearl-white beneath; poison-fangs small; head covered with plates. Up to 2 feet and upwards long.

I have only procured this on the Neelgherries towards the lower portion of the plateau. Dr. Cantor tells me that "the shields of the crown of the head resemble those of Trig. blanchoffi, Schlegel.

TRIGONOCEPHALUS (COPHIAS) VIRIDIS—Merrem. Russ. 1, pl. 9.

21 rows of scales, 154 Scutæ, 60 Scutellæ. Rare, I have only got it from the Eastern Ghats.

TRIGONOCEPHALUS (COPHIAS) MALABARICUS—n. s. ?

Very closely allied to T. nigromarginatus. Has 21 rows of smooth scales. Scutæ 145 to 149. Scutellæ 48 to 53. Green above, with brown transverse and zigzag markings. Up to 2 feet long nearly. Not uncommon in all the forests of the West Coast.

* One, 9 ft. long, which I procured about 20 miles S. of Calcutta, and now in the Society's Museum, is banded throughout. *Sankarachúr* and *Shakha-muti*, Beng. *Cur. As. Soc.*

Trigonocephalus (cophias) neelgherriensis—n. s.

Of small size, dark brown with black markings. 23 rows of carinated scales. Scutæ 142. Scutellæ 36. Not uncommon in woods on the Neelgherries.

Trigonocephalus (cophias) wardii—n. s. ?

Has 21 rows of carinated scales. Scutæ 154. Scutellæ 51. Greenish colour, with purplish-brown diamond spots on back and sides; 12 to 14 inches long. The scales of the head resemble those of T. sumatranus, Raffles, according to Cantor *(in literis)*.

Vipera Russellii—Gray. Russell 1, pl. 7.

'Kunnádi vyrien' of Tamools.

This well known and justly dreaded snake grows to a large size. I am strongly inclined to believe that the far-famed *Cobra monil*, or *Cobra manilla* of some, is merely the young of this species. The old orthography is *monil*, which simply means a chain or necklace, and whoever looks at the markings of this snake, especially of the young one, must be struck with the resemblance thereof to a necklace. I need hardly remind the reader that both *Cobra capella* and *Cobra monil* are Portuguese names, and I have little doubt, that the latter name was given to our present species by the Portuguese. It has however been forgotten as applied to this viper, and may now be considered a fable; for every one you meet is able, on his own showing, to point you out the *real Cobra monil* as quite distinct, and what is more remarkable, no two observers describe it alike, they only agree in its being a very small and a very deadly snake. I may here add that the *carpet snake*, another household word in the Madras army, appears to me to be equally fabulous, as I have not been able to identify it among the venomous snakes, several prettily marked innocent species having been, at different times pointed out to me as the carpet snake.*

Vipera echis—Schlegel. V. noratta—Shaw. Russell 1, pl. 2.

Kutta vyrien of the Tamools.

This little snake is very common in the Carnatic. I do not think its bite would prove fatal to man. I have known a dog bitten by one to recover.

* Generally, I think, the little harmless Lycodon aulicus (as indeed mentioned afterwards by Mr. Jerdon); and this, perhaps, from its habit of entering houses as much as from its markings.—*Cur. As. Soc.*

The above are all the venomous land snakes I have yet met with in Southern India. Of these the only ones at all common are the Cobra, the Chain Viper (Vipera Russellii), the *Bungarus candidus*, and the little *Vipera echis*. Most of the others are peculiar to the forests of India. The Trigonocephali are not usually fatal. I have known several cases of bites by *Trigonocephalus malabaricus*, and *Trig. nepa;* and none proved fatal. Great pain is experienced, and swelling usually follows, but the patient gradually recovers. I myself was bitten in the fore-finger by the *Trigonocephalus neelgherriensis;* I applied a ligature round the finger, and sucked the wound vigorously. In a minute or so the skin round the bite blackened, and in a minute or two more a perfectly circular bit of the skin came off in my mouth. I set off running immediately I was bitten, and felt no further ill effects. See Cantor's remarks on the bite of *Trig. sumatranus*, Journ. As. Soc., Calcutta, XVI, 1044-6; also Blyth, *ibid.* XX, 524.

PELAGIC.

Fam. HYDRIDÆ,—Bon.

HYDROPHIS COLUBRINA—Schlegel, var. ?—n. s.

I possess what is apparently a variety of this species of sea-snake. It differs from the finished drawing of the species in Cuvier's Régne Animal (Edit. des Eléves), in the black markings meeting on the back and abdomen, thus forming a series of light-coloured oval spots on the sides; the abdominal scutæ commence nearer the mouth, having only 3 or 4 series of small scales between them and the elongated mentals; the scutæ are above 300 in number, and the rows of scales are from 35 to 45—whilst in H. colubrina the scutæ are only 246—and the rows of scales 25. My only specimen is a young one procured at Madras.

HYDRUS SCHISTOSUS, Daud.—Russel 2, pl. 10. Up to 4 feet long nearly. Very common at Madras.

HYDRUS PELAMIDOIDES, Schlegel. Not common at Madras.

HYDRUS BICOLOR, Schneider—Russell 1, pl. 41. Rare at Madras.

HYDRUS STRIATUS, Lacep.—Russell 2, pl. 9? Not rare at Madras, up to 6 feet in length.

HYDRUS NIGROCINCTUS, Daudin.—Russel 2, pl. 6. Common at Madras.

Hydrus Cantori, n. s.—H. nigrocinctus, var.—Cantor, J. A. S. C. XVI, 1050.

Dr. Cantor described this as a variety of the last, in his valuable Catalogue of Malay Reptiles.

I forwarded him a specimen in 1848, and he remarked as follows on it. "From the examination of this specimen, the second I have seen, I am induced to believe it a distinct species, and not a variety of nigrocinctus." It differs from this last species in the more robust make, larger scales, there being only 21 rows on the body, and larger abdominal scales especially near the head; also in the shorter triangular head, &c. &c.

I never saw it at Madras, but it is not rare at Tellicherry on the Malabar Coast. Up to 2 feet in length.

Hydrus gracilis, Shaw—Russell 2, pls. 7 and 8.

The number of rows of scales varies from 26 to 35 on the neck, and from 44 to 51 on the trunk. Scutæ 350 to 450. Scutellæ 50 to 60. Very common at Madras.

Very remarkable for the small circumference of head and neck compared to that of the body.

Very common at Madras. Up to 4 feet long.

All the above sea-snakes are venomous, and their bite to be dreaded.

Fam. BOIDÆ—Bon.

Acrochordus granulatus, (Schneider)—A. fasciatus, Shaw.

Rare—Found sometimes in back-waters.

Python molurus, (L.)—P. trivittatus, Schl.—Russell 1, pl. 22. *Boa*, or Rock snake, of Europeans in Madras.

Found all over the country. I have not seen a specimen longer than 19 feet long. This was killed in Travancore, after having swallowed a doe spotted deer.

Boa (Gongylophis) conica, Schl.—Russell 1, pl. 4.

Not rare in the Carnatic and Malabar. It is considered venomous by some of the natives. Has a very malignant aspect. Up to 18 inches long and upwards.

Xenopeltis ? trivirgatus—n. s.

Brown above, with a triple series of black marks—beneath white, black-banded; of a shining nacreous lustre throughout. Scutæ 137. Scutellæ 29. 13 rows of scales. I have only found this on the Neelgherries.

Tortrix eryx, Schlegel—var. ?

Two-headed snake of many—common. Scutæ 205. Scutellæ 36.

Cylindrophis maculatus ? ?*

Cylindrophis curticeps—n. s. ?

Differs from the last in its shorter, more triangular head, &c. &c.

Cylindrophis macroscelis—n. s. ?

Differs from both in the much larger scales. These last 3 small species are not very common. They are sometimes found on the surface of the ground in rainy weather, but are generally dug out of the earth. They are called earth-snakes by the natives.

Fam. TYPHLOPHIDÆ.

Pilidion ? montanum—n. s. ?

Above bluish-black, yellow on the sides, with a black spot on each of the 3 lower scales; abdomen banded black and white. Scutæ ? Scutellæ 15. 15 rows of scales. 15 inches long. Found only on the Neelgherries.

Uropeltis ceylonicus.

Uropeltis affinis—n. s.

Differs from the last in its smaller scales, in the abdominal scutæ being larger, and commencing sooner.

They are both rare. I procured them on the Western Coast.

Onychocephalus acutus—Dum. et Bibr.

I possess one example of this curious reptile, which I procured in the Carnatic at Nellore. Dr. Cantor remarks, "Described from an unique specimen, habitat unknown."

Typhlops braminus, (Daud.)—Russell 1, pl. 43.†

Common under stones in the rainy season, usually called earth-worm.

* This, Dr. Kelaart has sent to the Society's Museum from Ceylon. *Cur. As. Soc.*

† This group, the Argyrophis of Mr. Gray, requires to be studied, as several species appear at present to be confounded. The Society's Museum has lately received Typhlops Russellii, Gray, from Chyebasa. *Cur. As. Soc.*

Calamaria sagittaria—Cantor.

A specimen sent to Dr. Cantor was so named by him; it had only 170 Scuta and 70 Scutella. It is not rare in forests in Malabar.

Coronella tæniolata—Russell 1, pl. 19?

15 rows of smooth scales; Scutæ 185. Scutellæ 41.

This species is referred to *Tropidonotus stolatus* by Cantor, but a snake that I possess and which answers tolerably well to Russell's description and figure appears to be a true Coronella. It is common at Madras.

Xenodon venustum, n. s.?—[X. purpurascens, Schlegel].

Above olive-brown with a triple series of irregular black spots, the central one edged with pale yellow; some transverse marks on head and neck. Has 17 rows of scales. Scutæ 142. Scutellæ 31.

Rare—found on the West Coast only; 1 foot long.

Xenodon dubium—n. s.?

Of a pale earthy brown colour, lighter on the side; a series of darker marks, irregular in shape, and edged with black. Scutæ 181. Scutellæ 41. Has 15 rows of scales. Rare—I procured it in N. Canara.

Lycodon Russellii—Russell 1, pl. 35.

Scutæ 193. Scutellæ 47. 17 rows of smooth scales. Rather common in Southern India.

Lycodon aulicus, (L.)—Russell 1, pls. 16 and 26.

Has 17 rows of scales. My specimens have only from 165 to 174 scutæ and from 54 to 61 scutellæ, which correspond with Russell's nearly, viz. from 171 to 174 and 40 to 41, whilst Cantor gives from 208 to 257 and from 57 to 91. One specimen which resembles in colour Cantor's var. B, (Lycodon capucinus, Boie,) does not differ in number of the scutæ, &c. Very common all over the country, often called Carpet Snake and considered dangerous, though of course harmless.

Lycodon platurinus, (Shaw.)

Scutæ 183. Scutellæ 76. Rare in Southern India—17 rows of scales.

Lycodon nympha—Russell 1, pls. 36 and 37, bad figure.

13 rows of scales; Scutæ 234. Scutellæ 87—not rare at Madras.

Lycodon assimilis—n. s.

Very similar in colour to the two last species, viz. black with

white bands. It differs in having 23 rows of scales. Has 190 scutæ and 60 scutellæ. I have mislaid the locality of this species.

COLUBER BLUMENBACHII, Schleg.—Russ. 1, pl. 34.

Dhamin, H.; *Sarray pamboo*, Tam.

Perhaps the most common snake in India, grows to a large size, 7 feet and upwards; frequents chiefly marshy-land, paddy-fields, &c. Scutæ 200. Scutellæ 125—17 rows of scales.

COLUBER FASCIOLATUS, Shaw.—Russell 1, pl. 21.

Scutæ 200. Scutellæ 58. Not uncommon at Madras and elsewhere in the Carnatic. I have seen it nearly 3 feet long.

COLUBER PICTUS, Daud. Russell 1, pl. 29.

Scutæ 202. Scutellæ 91—Russ.

ARBOREAL.

DIPSAS TRIGONATA—Russell 1, pl. 15.

Tati kattaday, Tel.; *Peri Surutay*, Tam.

Scuta 235. Scutella 83. Common in the Carnatic.

DIPSAS CYNODON?

My specimens correspond very well with the description in Schlegel. Scutæ 240. Scutellæ 110. Rows of scales 21.

Up to—feet and upwards in length. I have only found this snake in forests on the West Coast.

LEPTOPHIS PICTUS, (Gmel.)—Russ. 1, pl.

Kumberi mukar, T.; *Chettooriki pambu*, Tam.

176 scutæ and 140 scutellæ—15 rows of scales. Very common in all parts of the country.

LEPTOPHIS? BELLII?—n. s.

Scutæ 173. Scutellæ 64. Green above, with dark line on the sides bordered on each side by a pale stripe—17 rows of scales. This much resembles the drawing of Ahætula Bellii in Grey and Hardwicke. I procured one specimen in a grassy plain at Jalnah. It had killed and was swallowing a small *Vipera echis*.

LEPTOPHIS ORNATUS, Shaw.—Russ. 2, pl. 2.

Scutæ 209. Scutellæ 129—17 rows of scales. I have only procured this very handsome snake lately in Malabar.

LEPTOPHIS? NILAGIRICUS?—n. s.

Green above, yellow beneath. Scutæ 140. Scutellæ 73—13 rows of scales. Very common on the grassy hills of the Neelgherries.

Leptophis ? canarensis ?

Green above, yellowish beneath with a streak on the sides. Scutæ 140. Scutellæ 57—15 rows of scales. Procured in North Canara.

Perhaps these two last belong more properly to *Dryinus*. Of the last Dr. Cantor remarks—"Apparently *Dryinus prasinus*, var. A." —the number of the scutæ, &c. however differs very materially.

Dryinus nasutus.—Russell 1, pl. 12.

Green whip-snake. Scutæ 180; Scutellæ 158. Common all over the country. I lately saw one that had swallowed a Parroquet and became gorged.

Herpetodryas malabaricus,—n. s.

Olive brown with a dark streak along the sides, most conspicuous on the posterior portion of the body; a series of white spots on the anterior portion of the body, edged with black. Scutæ 222 ; Scutellæ 91—25 rows of scales. It is possible that this may be *H. helena*, as I possess a young one in which the markings differ somewhat, and much resemble those on Russell's figure, which is evidently a very bad one.* I have procured it in Malabar where it is not very rare.

Tropidonotus stolatus, (L.)—Russell 1, pl. 10 and 11.

Scutæ 146; Scutellæ 61—19 rows of scales. Seldom exceeds 18 inches in length; one of the most common snakes in India.

Tropidonotus schistosus, (Daud.)—Russell 2, pl. 4.

Scutæ 140; Scutellæ 85—17 rows of scales.

Tropidonotus plumbicolor, Cantor.

The colour of the living snake is leek-green. Scutæ (in a young one) 143; Scutellæ 36 ?—21 rows of scales.

Found in the Wynaad [also in Bundelkund, and about Midnapore].

Tropidonotus monticolus,—n. s. ?

Green, with a series of dark spots on the trunk, one on the centre of back and another on each side, the one on the right somewhat in front, the left one posterior, some white marks on the head; Scutæ 132; Scutellæ 85—19 rows of scales; eyes large; 3 feet and upwards in length. Common in the Wynaad, (2 anterior frontals, 3 posterior ditto, lowest scales rhombic).

Tropidonotus piscator.—Russell, 28 and 33.

19 rows of scales; Scutæ 139; Scutellæ 83.

* Coluber helena is quite distinct —*Cur. As Soc.*

Found in wells and tanks. Very common.

Homalopsis rhynchops, (Schneider).—Russell 1, pl. 17.

Scutæ 146; Scutellæ 65. Common in estuaries.

Homalopsis enhydris, (Schneider).—Russell 1, pl. 30.

Scutæ 150; Scutellæ 58. Found in the same localities as the last.

BATRACHIDÆ.

Cæcilia oxyura,—Dum. and Bibr. Found on the West Coast, but rare.

Epicrium glutinosum, (L). Found in Malabar. 2 cirri quite distinct.*

Rana tigrina. Bull frog. Found all over India.

Rana cutipora,—Dum. and Bibr.

In tanks in the Carnatic. Of a beautiful grass green colour, with or without a central yellow stripe on the back.

Rana leschenaultii,—Dum. and Bibr. The common frog of India.

Rana crassa,—n. s.

Of a thick clumsy form, feet webbed to the extremity of the toes; limbs shorter than in R. Leschenaultii, head wider, greenish above with dusky markings. Length $3\frac{8}{10}$ths; hind leg $5\frac{1}{2}$. Rare—found in a few tanks in the Carnatic.

Rana malabarica.

Found only on the West Coast, and chiefly during the monsoon when it enters houses, and makes a great gobbling, so much like a turkey that some people call it the 'Turkey frog.'

Rana flavescens,—n. s.

Of a buff colour on the back; yellow on the sides; limbs banded; feet webbed nearly to the extremities. Length of one $3\frac{2}{10}$ths; hind leg $5\frac{1}{2}$. Of slender make, pointed muzzle.

Found frequenting mountain streams in the forests only.

* Probably a distinct species from E. glutinosum of Ceylon, as sent by Dr. Kelaart. The latter has a strongly marked pale lateral band, and the *cirri* are less developed than they are represented to be in Mr. Jerdon's drawing. Dr. Kelaart, however, obtained a second species, which may be that noticed by Mr. Jerdon; and either may be identical with the *Epicrium* from Asám and from Pinang.—*Cur. As. Soc.*

Rana curtipes,—n. s.

Head very wide; muzzle obtuse; limbs rather short; feet webbed to the ends of the toes, except the centre one. Head and back above bright buff; sides deep marroon; legs dark purple with a few white spots; abdomen white mottled. Length of one $2\frac{9}{10}$ths; hind leg $4\frac{1}{10}$th.

Found in forest only. Has a very peculiar, rather pleasing call. Chiefly seen during the monsoon.

Rana agricola,—n. s.

Feet not webbed quite to the extremity. Of a greenish colour, mottled with darker. Length of one $2\frac{1}{10}$th; hind leg $3\frac{2}{10}$ths; foot 1.

Found in inundated paddy-fields and meadows.

Rana nilagirica,—n. s.

Very much allied to the last, differs in its much longer limbs. Length 2 inches; hind leg $3\frac{7}{10}$ths.

I have only seen this frog in marshes in the Wynaad and Neelgherries.

Polypedates leucomystax.

'Chunam frog' of Europeans. Very common all over India.

Polypedates variabilis,—n. s.

Green frog of the Neelgherries.

Green, sometimes unspotted, at other times with gold spots or blackish spots; at times golden yellow with brown spots; at other times brown with darker spots.

Length $2\frac{1}{2}$ inches; hind leg 4; foot $1\frac{2}{10}$ths.

Found in the Neelgherries in the banks of streams and in shrubs.

Ixalis? glandulosa,—n. s.

A small tree frog, with very obtuse muzzle, feet slightly webbed; abdomen largely glandular, tympanum indistinct; green above, yellowish on the sides and limbs.

Length $1\frac{2}{10}$ths; hind leg $\frac{7}{10}$ths; foot $9\frac{9}{20}$ths.

Rhacophorus Reinwardtii, Dum. and Bibr.

Found in the Malabar Coast on trees, and in grass during the monsoon. Not very common.

Limnodytes? phyllophila,—n. s.

A small frog, with the subdigital disks very slightly dilated; toes

not quite completely webbed; tympanum small; reddish yellow, with the sides of the face dark purple. Length $1\frac{1}{2}$; hind leg $1\frac{8}{10}$ths; foot $\frac{11}{20}$ths.

Found in all the Western forests among decayed leaves.

PHYLLOMEDUSA? TINNIENS,—n. s. Tinkling frog of the Neelgherries.

Fingers opposable; feet webbed at base only; yellowish red, or sometimes blackish above; side of head dark; inner fingers yellow; length $1\frac{1}{10}$ths; hind leg $1\frac{3}{10}$ths.

Found in grass and among bushes on the Neelgherries. Has a peculiar loud clear metallic tinkling call.

PHYLLOMEDUSA? WYNAADENSIS.

Somewhat allied to the last, differs in its larger limbs; larger tympanum, &c. Length about 1 inch. In this when the hind leg is drawn forwards, the end of the tibia reaches the muzzle; in the last it only reaches the tympanum; reddish brown above, limbs barred.

POLYPEDATES? SAXICOLA,—n. s.

A small frog with teeth, tympanum distinct, fingers webbed at the base; toes webbed to the extremities; pointed muzzle; dark olive green with dark marbling, and barred limbs. Length $1\frac{1}{10}$th; hind leg $1\frac{3}{4}$th; foot $\frac{5}{10}$th; femur and tibia reach beyond the muzzle.

Found on rocks in shady mountain streams in Malabar and Wynaad.

HYLÆDACTYLUS MONTANUS,—n. s.

Mottled green and brown above, Length $1\frac{7}{10}$th; hind leg 2; foot $\frac{7}{10}$th. Hab. Mountain streams in Wynaad, rare. [A very nearly affined species, if not the same, inhabits Mergui].

HYLÆDACTYLUS CARNATICUS,—n. s.

Of small size; marbled green and brown; muzzle more acute than in the last species; length $1\frac{3}{10}$th; hind leg $1\frac{3}{10}$th; foot $5\frac{5}{10}$th. Found in the Carnatic during the monsoon, rare.

BUFO SCABER, Daudin.

Common toad of India. Very abundant.

HYPERODON MARMORATUM.

Found in the Carnatic during the monsoon.

Pyxicephalus fodiens,—n. s.

Greenish marbled with brown. Length 2 inches; hind leg $2\frac{3}{10}$ths; foot $\frac{8}{10}$ths. Found in the Carnatic, burrows in the ground for $1\frac{1}{2}$ feet or so—[Hab. also Ceylon].

Pyxicephalus pluvialis,—n. s.

Nearly allied to the last; differs in its shorter thicker form, and shorter limbs; light greenish fawn, with dark marbling. Length of one $2\frac{2}{10}$ths; hind leg $2\frac{4}{10}$ths; feet $\frac{8}{10}$ths. I only procured this during the monsoon in the Carnatic. It is very different in appearance, though with so few essential distinctions, and the natives give a distinct name to each.

Pyxicephalus rufescens,—n. s.

Of a rufous colour above, whitish beneath; body rough and granulose; limbs barred.

Length $1\frac{1}{2}$ inch; hind leg $2\frac{1}{10}$; foot $\frac{6}{10}$th. Not rare in gardens on the Malabar Coast.

Engystoma ornatum.

Some specimens of this very handsome frog were only once procured by Walter Elliot, Esq. on the Neelgherries.

Length $1\frac{4}{10}$th inch.; hind leg $1\frac{6}{10}$ths; foot $\frac{1}{2}\frac{1}{0}$th.

Engystoma rubrum,—n. s.

Indian red above; some black marks on the legs. Length $1\frac{1}{10}$th inch; hind leg $1\frac{5}{10}$; foot $\frac{5}{10}$th.

Found in the Carnatic near rivers, in sandy banks.*

Engystoma malabaricum,—n. s.

Isabella colour above, varied with dark angular markings; sides dark purplish; throat ditto; limbs barred. Length $1\frac{1}{10}$th; hind leg $1\frac{6}{10}$th; foot $\frac{5}{10}$th. Found in Malabar, under stones.

Engystoma carnaticum,—n. s.

Nearly allied to the last, differs in the shorter muzzle, shorter hind leg, &c. Length $\frac{9}{10}$ths of an inch: hind leg $1\frac{1}{10}$th; foot $\frac{4}{10}$ths. Found in the Carnatic during the monsoon.

* Also Ceylon.—*Cur. As. Soc.*

Catalogues of Oriental Libraries, by Dr. A. Sprenger, *Secretary, Asiatic Society, Bengal.*

Certain it is that mankind would not lose much in arts and sciences, if all works in Eastern languages were destroyed. They contain few facts, if any, in Astronomy, Medicine, Mathematics, Natural History, or any other science, which are new to us. Even in poetry and philosophy, their works contain few sentiments or ideas which we can admire or would like to adopt.

A century or two ago people thought if they could only understand the language of birds, these *disinterested* bipeds would reveal to them where treasures are hidden, they would teach them the mysteries of nature, and enlighten them on the most important questions connected with our existence. In like manner some persons thought that in those venerable looking old oriental manuscripts, every science under the sun was locked up. Naturalists and orientalists have dug up their respective vineyards. Treasures they found none, but both parties have rendered the soil fertile. Naturalists, though they have learned no mysteries from the speeches of birds, have founded a noble science by dissecting their bodies, studying and comparing their physiology, observing their habits, and following up their geographical distribution. Man is a nobler object of study than birds, and the philosophy of history is a higher pursuit than the philosophy of nature. The acquaintance with the literature of the east shows us man reflected in his own creation under peculiar circumstances and through a longer period than the literatures of Europe exhibit him. The student is carried beyond the narrow limits of European prejudices and associations and enabled to enlarge them. Taking a historical view of oriental pursuits, they are of the highest philosophical importance. Moreover, in India a knowledge of the eastern languages both dead and living, and an acquaintance with their literatures, is the first condition for acting upon the natives, for making one-self useful.

It is from this wish to enlarge our knowledge of man and of his creations under various circumstances and in various periods of his historical existence, that several Governments and Institutions of Europe have of late taken measures to have *catalogues raisonnés* of

their collections of Oriental Manuscripts published, and others, we are informed, are still in preparation. In No. CCXXXV. of this Journal, the catalogue of the Asiatic Museum of St. Petersburgh has been noticed. Accounts of the catalogue of the library of Upsala and of that of Haven are in the Journal of the German Asiatic Society, and Professor Hall has promised us a notice of the first volume of the catalogue of the Royal Library of Berlin containing Sanscrit MSS. Among the catalogues which are preparing for the press is Forbes's catalogue of the Persian MSS. of the British Museum, and Morley's and Bland's catalogues of the Persian books of the India House library and the Persian books of the Bodleyan library. But the most important work in preparation, is a catalogue of the libraries of Constantinople, which is being compiled by order of the Sulṭán.

The catalogus Codicum Orient. Bibl. Acad. Lugduno-Batavæ, 1851, Autore Dozy, of which two volumes have been published, deserves a short account here, because the collection of oriental MSS. of Leyden is one of the best in Europe, and it has hitherto been by far the most useful. Professor Dozy has displayed very great judgment and learning in his labour, and his is probably the best oriental catalogue, that has yet been published.

These two volumes contain eleven chapters, and will be continued by another savant, Professor Dozy being no longer in charge of the oriental library of Leyden. I will mention here shortly a few of the most interesting books contained in each chapter with the numbers they have in the catalogue.

1 *Chapter; Encyclopædias.*

No. 2, مفاتيح العلوم by Abú 'abd Allah. Moḥ. b. Aḥmad b. Yúsof Khwárezmy Kátib who flourished in the fourth century and gives, in 15 chapters, the heads and some of the technical terms of the principal sciences of the Musalmans. There is a copy of this book in the British Museum bound up with several other useful treatises.

No. 5. نهاية الارب في فنون الادب by Nowayry who died in 733. This is one of the most important works in Arabic literature. It contains a complete Encyclopædia of the historical sciences of the Musalmans and consisted originally of 17 volumes.

No. 20. فهرست في اخبار المصنفين من القدما والمحدثين واسما

ما صنفوا من الكتب في سايرِ العلوم by Mo*h*ammad b. Is*h*áq Nadym who is usually called Abú-l-Faraj Ibn Aby Ya'qúb and who compiled this book in 377, and died in 385. In the Leyden library is the third and last volume of this important work, and at Paris is the first of the *same* copy; a complete copy has been sent from Constantinople to the Paris library by Baron de Slane. This book contains short biographies of all Arabic authors and the names of all their works, and is one of the most precious relics of antiquity we possess.

2 *Chapter; Grammar.*

Nos. 39, 42, 44 and 46 are specimens of the manner in which Grammar was treated during the earliest period of Arabic literature, and they are precious on account of their rarity. There is nothing else of much importance in this chapter.

3 *Chapter; Lexicography.*

Nos. 142 and 143 are two valuable copies of two valuable works of Ibn al-Sikkyt, a grammarian of the third century, but the most important work in this chapter is No. 116—the Jamharah of Ibn Dorayd. To the best of my knowledge there is only one copy of it in India, and that not a very good one.

No. 146. كتاب لطايف الاعلام is usually ascribed to Çadr aldyn and Qúnyawy (on whom see Jámy, Nafa*h*át, No. 538) and not to Mo*h*yy aldyn Ibn al'araby. I have two copies of this work, 'abd al-Razzáq's Çúfy Dictionary is an abridgment of it.

Passing over the next three chapters, we come to Belles-lettres, here the first book of great importance is the Kámil of al-Mobarrad, No. 365, (I have seen the name written with a Kasrah "Mobarrid,") it is not only valuable for philology but also for history, containing the best account of the Khawárij. There is a very correct MS. of it at Lucnow which has been copied for me; Mr. Wright has promised to edit it. Nos. 366 containing the Mowashshà of Abú-l-*T*ayyib and 367 are still rarer and nearly as important. The latter No. contains an old copy of a work in which Ibn Dorayd, who died in 321, has collected words and idiomatic phrases referring to the saddle and bridle. This and Nos. 368 and 369 are among the few remaining specimens of the hundreds of works of the same nature, which were compiled during the first three centuries of the Islám.

Several of the treasures contained in the chapter on Arabic poetry are already known to the public, at least by name, as the Hamásah, the Dywán of the Hodzaylites, the collection of ancient poems of Ibn al'araby, &c. A splendid old copy of Tibryzy's commentary on the Hamásah is at Cawnpore, and I possess a copy of the commentary of Abú 'alyy.

The only poetical work in Persian which deserves notice is the Rawshanáy námah of Náçir Khosraw whose takhaluç was *H*ojjat (No. 630). It is stated that it was composed in 343, but سیصد must be a mistake of the copyist for چار صد, for Náçir Khosraw was a contemporary of the F*á*timite Khalyfah Mostançir who succeeded in 427 and died in 487, and many poems of his Dywán are in his praise.

The library of Leyden possesses great treasures in history and geography, but owing to the liberal rules of the university, they have been much explored by orientalists of all countries, and are therefore generally known.

And what has India done in the way of preserving a record of the thousands of books which are moldering in its libraries, and annually destroyed by insects ? I should not have ventured to ask this question if it could not be satisfactorily answered. Sir Henry Elliot's *Indian Historians* is a work of too high an order than that it could be called a catalogue. It is a historical book. But there are other works in progress which in extent will far surpass any thing that has been done in Europe. Dr. Ballantyne and Professor Hall are preparing a catalogue raisonné of the Sanscrit MSS. of the Benares College, which in fact will be a general bibliography of Sanscrit literature, and Professor Hall is preparing at the same time a detailed account of near two thousand Hindi works of which hitherto hardly two dozens have been imperfectly known. The value of this publication for India will be incalculable. He has promised us an account of his labours, which, I hope, we shall soon receive for insertion in this Journal.

The Honourable Court of Directors has sanctioned the publication of the Catalogue of the Lucnow libraries, and 448 pages of it are printed. The sciences are not classed according to any logical arrangement, but those which are usually cultivated by the same class of men are grouped together in separate volumes, so that every

volume is in some way complete in itself and has separate indices. The great extent of the works renders such an arrangement desirable, in order that if it should not be completed, as much as may be published may be complete in itself. To every science, a chapter is prefixed containing the biographical works devoted to those men who were distinguished in that science: to the section on traditions, a chapter will be prefixed containing works on the biographies of person who collected traditions, in like manner to the section on law the biographies of Jurisconsults will be prefixed, &c. In imitation of Baron von Hammer-Purgstall and other orientalists, of biographical works, generally, a table of contents is given containing the names, principal dates and the titles of the writings of the subjects of the biographies. These chapters are therefore of considerable length. Of other works only the title of the book, a short account of the author, if none be contained in the chapter on biography, a short notice of the contents of the book, the date and the authorities on which it is founded—if they are quoted—the the size and the collection in which the book is found are mentioned. At the end of each volume three indices will be added, one of names of persons and places, one of book-titles and one of the initial lines.

The first 174 pages of the portion printed contain an account of 41 Persian Tadzkirahs, there is besides a Persian Tadzkirah mentioned under No. 62, and three or four will be mentioned in the appendix, they having come to hand after the above pages had gone through the press. Of several of these Tadzkirahs or biographies of Persian poets, a table of contents is given.

From page 175 to 192 twenty biographical works of Rékhtah poets are enumerated, and from page 195 to page 306 is a table of contents of the Rékhtah Tadzkirahs containing in alphabetical order short notices of upwards of fifteen hundred Rékhtah poets.

In page 307 begins the second chapter containing the works of Persian poets alphabetically arranged according to their takhalluç. The 142 pages which are printed of this chapter contain 236 numbers, the last name is that of Jámy, so that more than one half of the chapter remains to be printed. The remaining chapters of this volume will contain the works of Rékhtah poets, Dictionaries and Grammars of the Persian language, Inshás and tales in Persian, Grammars

and Dictionaries and Tales in Urdú, translations from Sanscrit or Hindi into Persian and Urdú, and Chaghatáy and Pushtú books.

At the end there will be an appendix of *corrigenda* and *addenda*. If the whole catalogue is completed, it will be an infinitely fuller and more correct bibliographical work of reference than *Hájy* Khalyfah's Bibliographical Dictionary.

Rev. J. Long's Catalogue Raisonné of Bengáli works has been already adverted to in this Journal, (ante vol. XXI. p. 632). It includes notices of upwards of thirteen hundred works, and will, we have no doubt, prove a valuable index to the vernacular literature of Bengal.

Notes upon a Tour in the Sikkim Himalayah Mountains, undertaken for the purpose of ascertaining the Geological Formation of Kunchinjinga and of the perpetually snow-covered peaks in its vicinity. —*By Captain* Walter Stanhope Sherwill, *Revenue Surveyor.*

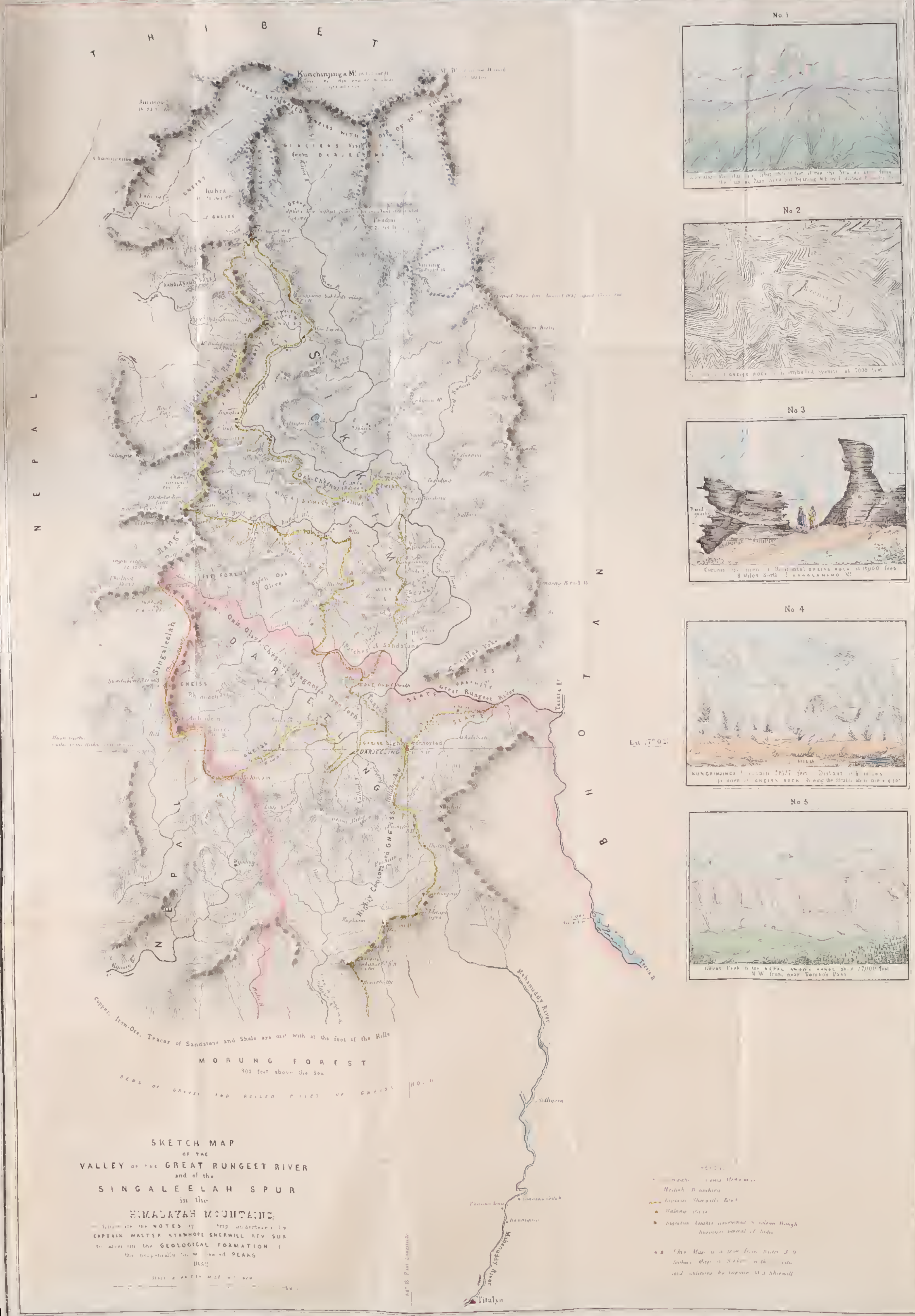
An unusually severe earthquake, that occurred at Darjeeling during the month of May, 1852, threw down several thousand square yards of the South Western face of the perpetually snow-covered mountain Kunchinjinga,* exposing a dark mass of rock, rendered darker perhaps by the brilliancy of the snow surrounding it. By the aid of a good telescope, the distance being forty-five miles, I could plainly perceive that the geological formation of Kunchinjinga was not of granite, as I had read it was only a few days previous, but of a highly stratified nature, the strata being, by the aid of a telescope, distinctly visible. The statement that the snowy-mountains near Kunchinjinga were of granite was published in a Botanical Magazine published in England, Dr. J. D. Hooker being the author of

* For the derivation and meaning of this word I am indebted to Lieut. G. B. Mainwaring of the 16th Bengal Grenadiers, who, with a praiseworthy industry, has mastered the Lepcha language, and was, in 1852, engaged upon the study of the Tibetan. The word is Tibetan and means,

English pronunciation.	*Tibetan equivalents.*	*English.*
Kon	Khng-s	Snow
Chin	Chhn	full or covered.
Jong	b'jongs	Coeval or equal to

གངས་ཆེན་མཛོད

Height above the sea, 28,177 feet (Waugh), the highest measured mountain in the world.


THIBET
NEPAL
BHOTAN
SIKKIM
DARJEELING
Kunchinjinga Mt.
GLACIERS Visible from DARJEELING
GNEISS
Singaleelah Range
Oak Chesnut
Fir Forest
Birch Oak Olive
Oak Olive Chesnut Magnolia Tree fern
Patches of Sandstone
MICA SCHIST
SLATE
GRANITE
Great Rungeet River
Gneiss highly contorted
DARJEELING
Highly Contorted GNEISS
Teesta R.
Mahanuddy River
Titalya
Silhgora
Copper, Iron Ore, Traces of Sandstone and Shale are met with at the foot of the Hills
MORUNG FOREST
300 feet above the Sea
BEDS OF GRAVEL AND ROLLED PILES OF GNEISS
SKETCH MAP
OF THE
VALLEY OF THE GREAT RUNGEET RIVER
and of the
SINGALEELAH SPUR
in the
HIMALAYAH MOUNTAINS
CAPTAIN WALTER STANHOPE SHERWILL REV SUR
GEOLOGICAL FORMATION
PEAKS
No. 1
No 2
No 3
Curious specimen of Horizontal GNEISS ROCK at 15,000 feet
8 Miles North of KANGLANEMO Mt
No 4
No 5
Great Peak in the NEPAL snowy range about 27,000 feet
N.W. from near Tumbok Pass
Lat. 27° 02'

the statement. Being anxious to settle the question I determined to travel as far North toward the foot of the snowy range as possible, and thus by diminishing the distance between myself and the exposed flanks of the mountain to obtain a clearer and nearer view of its lithological formation.

Being quite aware from the peculiar shape of the mountain and of its neighbouring peaks, that by advancing towards the snows by the valleys leading up towards Kunchinjinga, I should speedily lose sight of the mountain altogether, I determined to advance along the crest of the great meridianal spur Singaleela, which, from Darjeeling, appears to be connected directly with Kunchinjinga. Dr. Hooker's map of Sikkim also leads one to suppose that such is the fact, such however, is not the case as will be shewn hereafter.

2nd August, 1852. Having waited patiently for nearly three months since the earthquake exposed the flank of Kunchinjinga in order to allow the snow to reach its highest summer limit, I started this morning at 8.30 A. M. accompanied by Mr. Robert Smart, my second assistant in the Survey. Having just completed the Survey of the British Hill Territory, and having had several very fatiguing trips in the hills we were both in good walking trim, and had by our former experience learnt to travel lightly.

As we left the station of Darjeeling* the sun was shining most brilliantly, illuminating the snowy range to a silvery whiteness. As we turned the shoulder of Birch Hill, the most northerly point of the station, a splendid Panorama of all the country to the west and north of Darjeeling lay before us, a scene perhaps unequalled in beauty in the whole world. To the west the Singaleela range with its numerous peaks of 12,000 feet in height, its thousand buttresses composed of swelling mountains clothed with fir and rhododendron forests, shut out our view. To the north and in the centre of the Panorama stands Kunchinjinga, 28,177 feet in height, flanked on either side by numerous peaks scarcely inferior in height. To the east, the snowy range trending away to the south, and which is adorned with many fine bold and imposing peaks, forms the limit to the view. The lower unsnowed but forest-clad mountains Powhunry, Tendong, Pemionchi, Hee, Chakoong, Kirmee, and a hundred others

* i. e. Dorje the sceptre of the priesthood, "ling,," a place, "The holy spot."

all separated by deep valleys, through which flow impetuous torrents, and in one of which was visible the Great Rungeet pouring along 6,000 feet below us, form the most appropriate, because grand and beautiful foreground to the lofty, and perpetually snow-covered Himalayah, some of whose perpetually snow-covered peaks are only thirty miles distant. The air was so pure that the distance appeared reduced to five or six miles, and with a telescope rocks that had been hurled down by earthquakes, were seen reposing upon the green glaciers between Kunchinjinga and Pudeem mountains, doubtless on their way to the Moraines at the foot of the glaciers.

The descent from Darjeeling by the Tuqvor-spur to the little Rungeet river, is by a good Government road, and can be ridden upon the whole way down, which we did passing rapidly through the various botanical regions, or through oak, chesnut, maple, olive, walnut, birch, magnolia, to palms, tree-ferns, ratans: at 5,000 cultivation is met with, comprising barley, wheat, maize, buckwheat, rice, &c. then through Gordonia, pandanus, banian-trees, wormwood, twelve feet in height, to the Little Rungeet river 1,996 feet above the sea, which we reached in two hours and a quarter, having descended 5,169 feet.

The forest at 6,000 is peculiarly beautiful; the oaks, magnolias and other large trees being covered with gigantic pothos, epyphitical ferns, arums, and enormous creepers resembling ship's cables; the underwood consists of the tree-fern, some of which measure fifty feet in height and fifteen feet in girth at the base of the stem. The gracefulness of this botanical beauty can only be described by the pencil not by words.

Temperature of the air at Darjeeling 65° Faht.; at the little Rungeet at noon 89°; at 2 P. M. 91° 50′; temperature of the water 71°.

The little Rungeet which rises from the mountain Tongloo falls into the great Rungeet, three miles further down, and is here crossed by a substantial cane-bridge. The main chains supporting the bridge are composed of five ratan-canes each; the sides are of split cane hanging from either main chain as loops, two feet apart and three feet deep; into these loops, the platform is laid composed of three bamboos, the size of a man's arm, laid side to side; the sectiou of the bridge resembling the letter V.; in the angle or base of the letter the traveller finds footing. This being a Government bridge

and kept in proper order, the platform or bridge is about a foot in width. Those bridges that are constructed by the natives have only one single bamboo for the feet to rest upon; and across these frail bridges, the most wild and turbulent streams are crossed with safety. Outriggers, to prevent the main chains being brought together with the weight of the passenger, are rigged out at every ten or twelve feet, in the following manner: under the platform, and at right angles to it or parallel to the stream, strong bamboos are passed, and from their extremities to the main chains, split ratan-ropes are firmly tied; this prevents the hanging loop or bridge from shutting up and choking the passenger. The piers of these bridges are generally two convenient trees, through whose branches the main chains are passed and pegged into the ground on the opposite side.

The bridge over the Rungeet is about fifty yards in span, and fifteen feet above the stream. Across this narrow bridge I was surprised to see a hill dog trot, apparently quite regardless of the raging torrent beneath him.

The water being too rapid for the passage of our ponies, they were sent back from the right bank of the river, and from this spot our wanderings commenced on foot.

At this spot which is twenty-two miles in a direct line from the plains, and nearly 2,000 feet above the sea, I observed termites or white-ants who, under the shelter of their pierced earthen covering, were destroying the bark of an oak-tree. The many varieties of lepidoptera and dragon-flies that were fluttering about the gneiss rocks were remarkable for their great numbers and beauty.

On our way down the hill our attention was markedly arrested bya flock of birds—which our Lepchas described as being about the size of a black-bird and of a black and white plumage, for we did not get a glimpse of them—whose united voices exactly resembled a set of human maniacs screaming and laughing in horrid chorus. I never remember to have heard such a peculiarly wild and attention-rivetting sound as the voice of these birds; it was perfectly startling.

Left the Rungeet at 2 P. M. and ascended to the Goke guard-house, in an hour. The forest is particularly beautiful, the fici on a grand scale being the most remarkable feature in the forest. It is interesting to trace amongst the various specimens of this natural

order, the gradual but alternately certain destruction that they bring upon the largest and tallest trees in the forest. In places the young fig, only a few inches in height, may be seen at the foot of a noble oak as a humble plant; a little further on, it is seen as a handsome creeper embracing the oak with a thousand teudrils, which expanding and thickening with age, at last coalesce, forming a solid mass of wood which speedily strangles its original support; which, by decaying and falling away, leaves the fig standing, a hollow cylinder sixty or seventy feet in height, with an umbrageous crown of leaves and branches, a far more noble-looking tree than the oak it has killed. Others again trust to themselves entirely, and seek no foreign support; this species is met with at 4,000 feet above the sea; very giants in botany; they generally rest upon three, five or more beautifully-arched stems forty or fifty feet apart, which unite perhaps seventy feet from the ground into one common trunk; from this spot the branches spring to about the same height as the point of junction is from the ground. The beauty of these trees is much added to, by being generally covered with the gigantic pothos, or bignonias, or buteas, or with other enormous creepers whose long stems are seen hanging in wild festoons, some like golden threads and others like ragged and frayed cables of ships: some of the finest specimens of these figs are to be seen close to the staging Bungalow at Kursiou, on the road up from the plains to Darjeeling.

The Goke spur, wherever the road has laid bare the rocks, is found to be composed of a red micaceous schist, and towards the summit, 2,757 feet, of blue slate highly micaceous and separated from the upper or red schist by beds of hornstone.

At Goke there are eight houses and a guard-house, inhabited by the families of the sepoys on guard at this post. The guard consist of about eight men detached from the sappers and miners at Darjeeling, their duty is to guard the frontier at this spot, and to give the alarm at the approach of any armed men from Sikkim, and to prevent any of the British subjects being taken away as slaves into Sikkim. Similar guards are posted all along the Sikkim frontier, generally at spots where cane-bridges cross the Rungeet and Rummam rivers.

To the north of the Goke spur, and looking down into the valley of the Rummam river, which is seen and heard roaring along its

rocky bed, the eye wanders over a dense and beautiful forest. The huge buttresses thrown down from Singaleelah shut in the view looking up the valley, and on the opposite side of the Rummam, the steep Chakoong gneiss mountain exhibits numerous land-slips of great beauty. Chakoong is noted for its travertine lime deposits, which appear in the small streams flowing from its steep sides. Our entire march for to-morrow is in view, and a formidable-looking route it is. The Burpung mountain on the Heeloo range was pointed out to us as the spot for our next encampment, which cannot be less than 8,000 feet in height and distant five miles; but these five miles we have to traverse in the hot, dark, and miasmatic valley of the Rummam.

In the evening I observed several of those strange insects, bocydium, that are covered with snow-white and downy quill-like processes radiating in all directions from their backs. Any attempt to secure the pretty creatures for observation, even supposing they did not escape by hopping away, was a failure; as all their beauty was speedily destroyed with even the most gentle treatment, the slightest touch being sufficient to destroy all their snow-white covering.

The noise of the cicadas a thousand feet below us in the hot tropical valleys was quite deafening; their peculiar cry is quite distinct from the cicadas of Darjeeling, being louder, more metallic and of longer duration; much more cheerful and more pleasing to the ear. Two Buceros were seen flying over Little Rungeet; these curious birds build their nests in hollow trees, and defend them with great bravery. The Lepchas secure the living birds by putting a net over the orifice of their nests, and sell them at Darjeeling.

From the guard-house looking south, a fine cascade is seen dashing down the Tuqvor spur.

Cultivated plants observed at Goke were tobacco, tomato, stramonium, banghun, sém bean, Indian corn, red spinach, kuddoo, chillies, and French marigold. Wormwood and black pepper were seen wild. Before the doors of several of the houses were baskets containing the new shoots of the bamboo gathered before they force themselves above ground. The shoots are collected, put into baskets, the mouths of which are laden with heavy stones, and placed in the sun for several days, when fermentation takes place; the shoots are then

eaten as pickles, forming a pleasing acidulous adjunct to the Limboo's simple rice diet. The fresh shoots, which I tasted, resemble a new and sweet walnut.

3rd August, 1852, direction North-west.

At six this morning we descended the steep northern face of the Goke spur by a footpath, along which the Sikkimites attempted an entry into Darjeeling, during the late disturbances. I measured the slope of the path and found it to be 30°, a most uncomfortable gradient for a rough and narrow footpath flanked on one hand by a nearly precipitous descent, down which Mr. Smart and myself both rolled, until stopped by the dense underwood. Our road lay through a dark forest of noble trees, principally Gordonia, called by the Lepchas "sum brung kun," whose smooth, upright, and perfectly straight stems present fine specimens of forest trees. Most of these trees were encircled at various heights by epiphytical ferns, growing in a crown-like form completely round the stem. Each frond of this elegant fern measures five feet in length, and from the great elegance of its shape serves to adorn the tree that bears it. The underwood was principally composed of the gigantic bamboo, fici, bauhinias and ferns; the whole so thick, matted and tangled as to render the forest as dark as late twilight; not a ray of sunshine could penetrate or shine upon us; but I noticed that wherever a stray beam of sunshine did force its way through the tangled masses of foliage overhead, that it tinged the ground with a deep purple or garnet colour. The noise from the cicadas was quite oppressive and wearisome. One was caught and, as I conjectured yesterday, was of a totally different species from those seen at Darjeeling. It had transparent wings, and was three inches in length. On its sides are too long horny plates, and upon pressing these plates whilst the animal continued to cry, a modulation of the extraordinary and wild sound emitted by this strange fly was caused, bearing however no resemblance to harmony. Under skilful hands and by delicate manipulation, a tune might be extorted from this cicada, thus in a measure verifying the old fable of the cicada having been used as a supplementary note to the Lyre.

The underwood abounded with the yellow webs of the large red and black Epirœ, or bird-eating spiders, each web containing a spider.

A troop of red monkeys were gambolling and shouting in the trees; their voice is quite different from that of the common red monkey of the plains.

Three quarters of an hour after leaving Goke we crossed the Teryook stream at its junction with the Rummam river, and after travelling along the banks of the noisy, boiling and foaming Rummam for an hour more, we crossed to its left bank by a very frail and dangerous cane bridge of about 300 feet span, and commenced the steep ascent of Chakoong. We now stood in the Rajah of Sikkim's territory.

The Rummam immediately above the bridge comes tearing round a sharp corner of the mountain, and with one bound dashes over a group of gneiss rocks. The trees dipping their branches into the very water, the lofty forest-clad mountains on all sides, from whose very bosom, the river appears to dash at once, the roar and noise of the water—altogether present as pretty a picture as can be well imagined.

After a toilsome ascent of several thousand feet through forest trees and through several clearances planted with cotton, we reached two Lepcha huts, where we were most kindly received and invited to shelter ourselves from the burning sun, and to partake of the delicious "chee" or acidulous infusion of the Murooa (Eleusine), which is always presented in a joint of a bamboo, from which receptacle it is sucked up through a hollow reed so cut at the sides as not to permit the small grains to pass up into the mouth. The liquor resembles in taste, dilute Hock or Sauterne, and is very refreshing. It is slightly intoxicating, and is seldom seen above 6,000 feet elevation.

The huts of the Bhotia and Lepcha reminded me of the huts of the Rajmahal hill tribes. Having no caste, no great secrecy is sought for in the construction of the house, which consists of one large room thirty or forty feet square, raised upon wooden posts, the walls, roofing, beams, rafters, flooring, and fastenings being all composed of bamboo; the thatch is of grass. There are generally two or more fire-places in the room composed of loose stones upon a mound of earth, the whole retained in position by a square fender of bamboo.

In the house we visited, there were two women, many children,

and about ten men. Wandering round about the house were cows, pigs, poultry, goats and dogs. In the interior of the house there were two fire-places, at both of which food was being cooked, consisting of rice and tea. Tea in these mountains is drank after the following extraordinary manner. Into a large earthen cooking-pot, full of hot water, a quantity of black tea that has been chopped from the end of a brick of tea, is thrown, together with a little salt, butter and barley-meal; this mess after being well stirred, is served up in a teapot, each partaker of the tea producing his own wooden tea-cup from the bosom folds of his capacious clothes. In various parts of the house, depending from the ceiling were balls of cotton, various little bamboo baskets,—a half-finished woven piece of cotton cloth, earthen cooking pots, gourds, wooden spoons, a cotton-cleaner, a spinning-wheel, several large Chinese hats, nine feet in circumferance, fishing nets, heads of millet, a book of Boodhist prayers, a few English bottles, a pair of cymbals, bows and arrows, bead necklaces, large Lepcha knives, or Bán, hatchets, a drum, several blocks of wood used as tables, a few bamboo mats and a deer skin:—such is the simple property of a Lepcha, one of the happiest, merriest, and most humane of our species.

Close to our hut we could hear the roar of a cataract, the scenery round about the house was most pleasing.

After reposing during the heat of the day with the friendly Lepcha family, we started and in an hour reached a Lepcha Lama's house or Goompa, an immense building divided into two compartments. The Lama being absent, the whole house was delivered up to us; we took possession of one room about thirty feet square nicely boarded with broad and well laid planks. At the East end of the room was au altar, but divested of many of its usual utensils. There were nevertheless many holy-water brass cups, eight books of prayers, in a stand close by the altar, a sacred drum with its curious crooked drumstick, a pair of yak horns, cymbals, brass images representing gods, bells, conch-shells, charms and a dorje or the brass sceptre of the priesthood, resembling an English constable's handstaff, surmounted by a regal crown; besides these articles forming the furniture of a Boodhist altar, there were English Eau-de-cologne bottles, a tea-cup, a blacking bottle, a two-foot ruler, and lastly, a

French deal box, that had once held brandy, and addressed in good English to "Mr. W. Martin, Darjeeling." The usual human thigh bone trumpets were locked up, they being considered too precious to be left about. These bone trumpets, if possible, are the thigh bones of Lamas, some of them are highly ornamented with brass work brought from Thibet. The two condyles at the extremity of the bone are pierced and the bone hollowed out and when about to be used, a small quantity of water is poured down the bone to make it sound clear. The sound emitted is like that from a brazen horn, and as a small hand drum, with pellets of clay or brass tied upon strings depending from the rim and serving as drumsticks, is generally used in the other hand, the noise produced is stunning. In several Goompas or monasteries, I have requested the Lamas to blow up the bone trumpets, to which requests they have always good naturedly acceded, terminating their performance with a hearty fit of laughter at their own strange and wild noise.

The whole of the walls of our room were decorated with mystic squares, triangles, and other figures of white, yellow, and black pigments; the door was a block of wood turning on its own heel which was stepped into a wooden socket, the walls were composed of planks and wattles covered with mud and pierced with two windows with sliding shutters. The Lama receives five rupees from the Sikkim Rajah annually.

This Goompa or monastery is situated near the large landslip that is visible from Darjeeling, this landslip, which is several thousand feet in height and one hundred broad, has a pretty stream of water flowing amongst its rocks; when heavy rain takes place the rocks begin to move downwards, causing a low rumbling sound, loud enough to awaken the members resident at the Goompa. The view from this spot looking back upon Darjeeling, only nine miles distant, the deep valleys at our feet many thousands of feet deep, the lofty Tonglo mountain to the South West and the foaming cataract on the landslip, well repaid us for two days' toil and the suffocating heat of the valleys.

Around the neck of one of the Lepcha children, hung as a charm, I observed, the following curious collection of oddities, a leopard's and a barking deer's canine teeth, an ornamented brass bead, a piece

of ginger, a clove of garlic, and the hard seeds of a forest tree, all strung upon a cotton thread. All the men, women and children who could afford it had the small silver current British Government coins, eight, four, and two anna pieces soldered on to brass rings, and worn either on the fingers or round the neck. To those who had no silver coins, I made a present of a quantity.

4th August.—Left the Goompa at 6.30 A. M. passed some good Limboo huts and clearances principally sown with cotton and murrooa, and commenced a stiff ascent. On passing the Limboo huts, we found men, women and children all hard at work, husking grain; fine English looking cows, pigs and poultry were lying about or strolling round the neat houses, which are built of split bamboo roofed with the long and broad leaves of the wild ginger and cardamom which abound in the forests at this elevation, the roofs are guyed to the ground with long rope-like rattans, to enable them to resist the powerful blasts of wind that descend the mountains with enormous power, and that without one moment's notice.

The ascent of Syrioong Burpung, such is the name of this portion of the Hee mountain, occupied us an hour; the ascent the whole way being through fine fields of Indian-corn and three kinds of murrooa. On the crest of Syrioong the heavy forest commences, and at this spot is a small cairn of stones, marking the boundary between the Jageer or estate of Lepcha Pongring, who resides at Tullam on the banks of the Rummam, and of the lands of the Rajah of Sikkim. At 10 A. M. we halted to breakfast at a beautiful waterfall, with a fine body of water dashing down the side of the forest-clad mountain by eight or nine leaps. A small portion of this waterfall is seen from Darjeeling as a white speck on the face of the mountain.

After crossing Syrioong the footpath runs through a dense underwood of rose bushes, stinging nettles, black mud, and running streams, through which we were obliged to wade; our legs and feet getting covered with numerous leeches, and our hands and faces stung by nettles and peepsas.

The peepsa is a small dipterous fly of a black and metallic green colour with spotted legs and a small head. It bites without any pain, attacking any available part of the body, upon which it feeds

for about three minutes, caressing the part the whole time by raising and depressing their delicate fore legs alternately, as if thoroughly enjoying the sanguineous draught; when their bodies are distended with blood, they fly away, leaving a small round purple spot of extravasated blood, very irritating, and, with some people, attended with considerable inflammation. If the fly is disturbed before it has had a full meal, a small flow of blood takes place, and relieves the bitten part. There are several kinds of peepsas, some are so small that they are barely visible to the naked eye; this kind however give a most stinging bite, and, although not seen, are felt in a very decided manner. The peepsas range from 2,000 to 8,000 feet.

A hasty breakfast being despatched, for it was impossible to stand still without being covered with leeches, we proceeded till eleven o'clock, when, being fully drenched by a smart shower, and by crushing through the wet underwood, we halted, lit a fire and dried ourselves; our legs, arms and bodies smarting from leech-bites and from the abundant wounds of the formidable stinging nettles which sting through the strongest clothes.

During our halt, our Lepcha guide made a breakfast of roasted spinach that he had collected in the murrooa fields in the morning. Rolling the spinach up in some large leaves he thrust the bundle into the hot ashes, where it remained ten minutes; he then withdrew the bitter feast and consumed it, adding raw but crushed stinging nettle tops as a sauce to the whole. It would require more boldness than most people possess to induce any stranger in the hills to attempt to put any portion of such a formidable-looking plant as the Sikkim stinging nettle into his mouth for transmission to the stomach. The leaves are armed with innumerable sharp spikes a quarter of an inch in length; not only are they spread over the whole of the upper surface of the leaves, but they also appear on the point of each tooth of the deeply serrated edge of the leaf, and upon the leaf stalks and stem of the plant. Each spike at its base is provided with a small white bladder or gland containing the poison. The plant attains the height of four feet; with a leaf upwards of a foot in length. Their wound causes much pain, and sometimes violent sneezing and fever; one kind in particular mentioned by Dr. Campbell, and named the "mellumba," produces running at the eyes,

nose, sneezing, fever and sometimes death. In addition to the above pungent food, my Lepcha consumed young and tender fern tops, a white fungus found upon trees, a sharp acid plant, and several other leaves and roots. A Lepcha affirms that he cannot starve as long as he is on the hills; this appears to be true, as he makes almost the whole vegetable kingdom subservient to his appetite.

Left the fire at 1 P. M., at 2 P. M. we were on the summit of Rutto, a wooden mountain; after rather a level walk of two hours, we halted for the night at 4 P. M. a few paces from the left bank of the source of the Rishi, which stream falls into the Great Rungeet river. The Barometer gave our elevation 8,030 feet, Thermometer 67° at 4 P. M. or just beyond the region of the leeches. Just as we had got our small tent up, heavy rain commenced to fall which continued during the greater portion of the night, penetrating our small tent and wetting our bedding. A good supper and a sound sleep refreshed us, nor did we much care for the sprinkling we got during the night. Near our tent was a tempting L'hap, or cave, formed by an overhanging mass of gneiss rock; but as it was not found large enough for us and our fifteen Lepchas, we cleared away the jungle, pitched the tent, slung the barometer and turned in for the night. I felt satisfied that our Lepchas were enjoying no worse fare than ourselves; they had two tents furnished by me for their protection; we had no servants to cook for us, no beds, no comforts, beyond a good layer of ferns to lie upon, and a blanket to cover us. A strong decoction of coffee morning and evening, with a handful of bread rusks and a slice of ham or bacon, forming our entire food during the twenty-four hours.

Lucifer matches, flint and steel, and several other modes of procuring fire being utterly unavailing in these damp mountains, the Lepchas were never at a loss to supply us with that necessary element, so conducive to comfort and life; for upon halting, our merry guides and coolies produced fire by causing one vertical piece of dry wood that was sharpened almost to a point to revolve rapidly in a mortise cut in another horizontal piece of wood; both pieces of wood were highly dried and smoked at their homes and exactly resembled two round rulers. The rapid revolution of the upright piece of wood upon the horizontal piece, produces by friction a dry sawdust, which, after a minute's working round and round, catches fire. The

wood resembles willow and is procured from a shrub that grows in the hot valleys and generally from the banks of the mountain torrents. Two men work the upright piece of wood, the other is placed upon the ground, or more generally upon the large Lepcha knife. The upright stick is seized between the palms of the hands, and made to revolve rapidly first to the right and then to the left, the pressure used causing the hands to descend from the top to the bottom of the stick; upon the hands reaching the lower stick, the second man commences from the top; and so on, in quick succession, until fire is produced; one mortise or hole produces fire four times, when a new one is made, the old one being worn through.

5th August, 1852.—Started at 8 A. M. in a North Westerly direction, and in three quarters of an hour we were upon the summit of Heeloo, about 8,500 feet (Heethloo of Hooker's map), at which spot were boundary stones separating two small estates of Sikkim. From this spot we commenced a rapid descent, which soon brought us again upon our tormentors the leeches, which swarmed upon every leaf, upon every stone. In an hour I had received fifty bites upon the ancles and legs; and allowing that only one in ten that managed to get upon my person bit me, I must have had five hundred of these troublesome and loathsome animals upon my person within an hour.

The leech of the Himálayah is first met with at 4,000 feet elevation, it is of a small black species, and, when young, is as thin as a needle and about an inch in length; when full grown it is still very small not measuring more than two inches in length, even when gorged with blood—at 5,000 feet their numbers increase; but at 6 and 7,000 feet up to nearly 8,000, they swarm in myriads, every leaf, bush and stone being covered with these annelides. From 8,000 to nearly 10,000 there is a hiatus, at which elevation these animals are not found, but from 10 to 11,000 feet, another species is found, but not very abundant; it is of a snuff brown colour with a black line down the back and a white stripe down each side of the body. This is not such a blood-thirsty animal as the black one, but is more sluggish.

The Lepchas affirm that the leeches spring from the bushes on to the traveller; this is a mistake, they *fall* upon a passer-by from

boughs over his head, and with the greatest activity cling to the shoe or foot, although only on the ground during the short period required to make a step. We tried tobacco leaves, dried snuff, of which we carried mulls full; we tried having a man behind to watch our naked legs, for it is impossible to keep the calves of the legs covered, otherwise every leech that managed to get upon your person would have a feast; but all to no purpose. The bites were as numerous as ever; although from the effects of the tobacco, I have turned out from my shoes at the end of a day's journey, thirty or forty dead and completely dried up leeches. If the leg is thoroughly protected with leather gaiters, the leech will be driven to bite higher up, and will insinuate itself up the sleeves or down the neck; in fact there is no remedy yet discovered that will keep them off your person. They are not seen during the winter, nor during very heavy rain: between the showers of the rainy season is the period of their greatest activity.

At noon we were a few hundred feet above the Limboo village Hee, having descended 3,000 feet, and now stood opposite to the noble mountain on which are situated the monasteries of Pemionchi and Chanachelling, on the northern side of the Kullait river. The Thermometer stood at 75°, and the power of the sun was so great as to necessitate the use of an umbrella. A pretty Bhootea woman with a child on her back brought us from her house, where she and her husband lived whilst tending a herd of cows, a large bamboo of fresh milk probably holding a couple of quarts, and subsequently she brought us two bamboos of the delicious chee, only to be enjoyed where there is great heat. A present of a quantity of silver two-anna pieces seemed to please her very much, for she ran for her husband, a regular Mongolian with a goitre, who, she assured us, would act as our guide for a short distance.

As dysentery was raging at Hee, our people begged of us not to go to the village, as they believe that the disease is infectious; indeed not one of our Lepchas would have followed us had we insisted upon proceeding in that direction; so having enjoyed the view of the magnificent mountain, and having taken the bearings of the Goompas that were perched 4,000 feet over our heads, our guide led us through the forest in a westerly direction.

Soon after leaving the cow-herd's hut we came upon two upright posts, the height of a man, stuck upon either side of the footpath and connected at the top with a horizontal post, from which depended two bundles of sticks, a foot in length, each bundle containing fifteen sticks; near these bundles were two wooden cudgels, also hanging by strips of rattan—a few feet removed from this group were two other poles erected on either side of the road, but unconnected with any horizontal bar. The meaning of these posts and sticks is as follows:—Any one coming from the direction of the two disconnected poles may pass on free and unmolested; but any one daring to pass from the other side, which points to the infected village, and in this case pointing to the dysentery-infected Hee; would be assuredly beaten with the two pendant cudgels under which he or she passes, and moreover would be fined thirty rupees, the number of pieces of wood tied up in the two bundles. Thus whenever small-pox, dysentery or any other complaint breaks out in a village, a strict sanitory cordon is drawn around the infected village, and no one is allowed to move out.

At 1-30 P. M. halted on the banks of the Mik, a tributary of much beauty to the kullait river, an affluent of the Great Rungeet. Over the Mik is a small bridge of rough trees with a bamboo bannister, the stream is twenty or thirty feet broad, and dashes by a series of leaps over a group of gneiss rocks. The noise was deafening, but the scene beautiful.

Just before reaching the Mik, I broke down and secured a large handsome fruit of a cucurbitaceous plant that was twining up a tree, the leaves were palmated, fruit about one foot across, and had the appearance of a musk-melon that had been pressed from both ends until considerably flattened. The Lepchas called it *kuthoor phort;* they immediately, but with some difficulty, dashed the fruit to pieces on the rocks, extracted from the inside five or six large red seeds, two inches in length, which, when broken open, I found to contain a milk-white kernel tasting like a new walnut. The Lepchas put the stones into the fire and, when roasted, offered them to us; they were delicious.

The case of the stones is as hard as a walnut shell, veined with deep sutures like a peach stone, which it resembles in colour.

Having washed all the leeches off our legs, we started and ascended a very steep and rocky mountain, and at 4 P. M. halted at a group of Lepcha huts named Rudhoo at an elevation of 6,517 feet. We took possession of a Lepcha house, the owner of which was absent. The view from this spot is very beautiful; five thousand feet below us the Kullait river, a mass of foam from its headlong speed, was visible, looking both up and down the valley. Immediately to the north of us and shutting out all view of the snowy range, stood the imposing steep and rocky mountain Pemionchi; magnificent forests of oak, chesnut and walnut clothing its steep sides. Immediately opposite to our house, we could see a fine cascade dashing down one of the deep ravines in the face of the mountain. The monasteries on the summit, the Cazi's village and residence near the summit, the numerous deep dells and ravines with which the sides of the mountain are indented, the distant mountains looking towards the East, and Heeloo, over which we had travelled this day, the little village of Hee overhanging the river—all combined to form as pretty a picture as we could desire to look upon. The Kullait river rises from the Singaleela range, flows between the Hee and Pemionchi mountains in a valley with an average depth of 6,000 feet for twenty-four miles, when it falls into Rungeet. Every spur descending from these two fine mountains has a separate name, and the whole of them are cultivated up to 5,000 feet, or 1,500 feet below where we stood, with rice, Indian-corn, and murrooa.

The mountains in the valley of the Kullait are far more grand and steep than any I have yet met with in the lower Himalayah. Pemionchi is composed of a bright and glossy micaceous schist; Heeloo of gneiss.

During this day's march, and as we were proceeding across a hill torrent in a most orderly manner, a young merry Lepcha behind me gave a loud scream, which seemed to electrify the whole of our Lepchas; down went bag and baggage from every shoulder, my guide, who was dressed as a non-working man in scarlet and finery, commenced most irreverently to strip off his finery, and to my horror almost threw my mountain Barometer into the nearest bush—when he had stripped himself he dashed into the stream, and commenced diving his hands under every stone near him or thrusting a

long stick under the more distant ones, whilst the other Lepchas were busy throwing branches of trees and bushes into all the small channels where any animal could possibly find a passage. The shouting and screaming that was kept up rendered it an impossibility to get an answer from any of the Lepchas; at last after my frequent enquiries as to what they had seen, my guide, with open mouth and eyes, told me that it was a fish with hands and legs that they sought; in other words they had seen one of the large brown edible hill frogs which, to judge by the immense sensation caused by its appearance, must indeed be relished by a Lepcha. The search, I am sorry to say, was a fruitless one.

Our homely meal this evening was added to by our Lepchas, who brought us a quantity of the roasted shoots of the young bamboo, which are put into the ashes until thoroughly heated; these shoots, which are conical in shape, and of the size of a man's forearm, or a foot in length and four inches in diameter at the bottom of the cone, are deliciously tender and sweet, resembling an artichoke in tenderness, and a good young cabbage mixed with new walnuts in taste. The only parts that are not edible are the Septa dividing the joints. These shoots and the roasted seeds of the Kuthoor Phort served up upon a large leaf were most welcome additions to our salt supper.

6*th August*, 1852.—Left our Lepcha hut at 7 A. M. The hut we had slept in had its walls composed of large sheets of bark, some as much as four feet broad and seven in length. This hut and two others constitute the village of Budhoo.

Just as we were starting, the Lepchas of Budhoo brought us as presents a large live cock, baskets of rice and some milk. The latter being very acceptable I took it, making them a present in return; and having given a silver coin to each member of a small troop of children, we proceeded in a westerly direction or up the valley of the Kullait, hoping by this route to reach the summit of the Singahleelah range. Immediately upon leaving the huts, we entered a fine forest of oak, chesnut, walnut, birch, olive and other fine forest trees; our path was about 3,000 feet above the Kullait which we could hear roaring below, as it dashed over the huge rounded masses of gneiss which compose its bed. Numerous kokla or green pigeons

inhabit these forests; their note is like a plaintive run upon a flageolet.

At the entrance to all the Lepcha clearances I observed forked sticks about eight feet in height supporting numerous wooden swords, minature baskets full of rice, eggs, the crops of fowls filled with rice, little bundles of herbs and flowers, fowls' legs and small baskets of raw cotton; these are offerings made to an invisible being who is said to reside on the banks of the Cholamo Lake in Thibet, whence the Teesta river (Lachen) takes its rise, and who is said to wield a great sword, with which he deals out death and destruction, as well as sickness and famine. The wooden swords are to deprecate his wrath; the productions of the earth and of their farms are offered partly as free-will offerings of gratitude for their abundant harvests, and partly as votive offerings.

At 8 A. M. we crossed a foaming cascade, which was descending over gneiss rocks with a headlong pace down the face of the mountain towards the Kullait. At 9 A. M. we were at the bottom of a deep hot valley, in which flows the Rennier stream, this is a large deep and rocky river flowing from Heeloo. Looking up the valley I perceived that the forest trees, crowning the heights many thousand feet above us, were all leafless, the foliage having been destroyed by the snow. The Rennier is crossed by a large fallen tree thrown from bank to bank, notched to prevent the feet from slipping; with an apology for a bannister, consisting of a few sticks tied together in the rudest manner with creepers, which frail support a Lepcha was obliged to pull quite tight whilst being used, otherwise it would be of little use to a traveller crossing such a boiling, howling chauldron, as raged below us.

The banks of the stream presented hornstone, and in the bed were blocks of a very beautiful gneiss, the component parts of which were intense black mica and pure white quartz.

A little below the bridge there was a strong wooden palisade supporting a quantity of elongated conical fishing baskets and extending quite across the river, destined for the capture of the edible frogs.

At 11. 30 A. M. after tediously cutting a path through a regular tropical growth of underwood, we reached a small stone fort prettily perched upon a knoll commanding a complete view both up and

down the valley of the Kullait, a wild and beautiful scene. The fort, which is built of flat slabs of gneiss rock, is fifty feet square with walls eight feet in height, with a square bastion in the centre of each face; the walls are pierced for musketry. Within the fort are two houses the residence of a Bhooteah, by name Cheoong Lethoo, who styles himself the Sirdar or chief of Singaleelah, and of the valley of the Kullait; he receives no pay from the Rajah of Sikkim, but has to collect soldiers from his district, when required, which, I imagine, is not often the case. This little stronghold is surrounded by fields of Indian corn, rice and murrooa. Immediately under the walls were cucumbers and chillies, whilst all beyond this small cleared space is dense forest. The fort was built by the present owner's father, who was a man of note in Sikkim. As we approached the fort, the Sirdar was seen parading up and down upon the top of the walls, gun in hand, his basket hat, which was highly ornamented with sparkling plates of mica, shining like a helmet in the sun. He seemed wonder-struck at seeing our long line of fifteen coolies and two Sirdars, headed by two Europeans, invading his forest fastness, where from the commencement to the close of the year a stranger is never seen. Our presence seemed to distress him very much, and it was some time before he would condescend to answer any of our questions regarding the road up to the summit of Singaleelah. A present of gunpowder, shot and ball for his old English single-barrelled gun seemed to please him, as he soon after volunteered to be our guide to a village where his wife and family were residing a few miles further up the valley, and where we should be obliged to halt for the night. This was most fortunate, as, without his assistance, we never could possibly have found the footpath which crosses and recrosses streams and forest tracts, in some places without a trace of a footpath.

From the fort we descended to the banks of the Kullait, which river we skirted for a short distance until we came upon the spot where the Sungroo and Sungsor streams, both flowing from the south, fall into the Nyu, a feeder of the Kullait, only a few yards from each other. The noise of the three streams, filled as they were by the late heavy rains, can only be understood by a visit to the spot. The roar and confusion caused by the falling, bounding and foaming

water, the forests, the strange attire of our party, every member of which was bleeding profusely from both legs from the leech-bites, formed a strange, unpleasant, though curiously wild picture. Both streams are crossed by trimmed trees; between the two streams a stone wall pierced with embrasures crosses the road, flanked by the Nyu river on one side and by the steep and wooded mountain on the other. This defence was erected by the Sirdar's father to repel the Goorkas, who more than once have threatened Sikkim with invasion, since their great invasion of 1787 A. D.

Close to the stone wall above-mentioned is a Mendong, a solid stone edifice resembling a wall; they are found all over Sikkim; they are generally about twelve or fifteen feet in length, six feet high and two deep, with a centre distinguished by being thicker and higher than the sides; on the faces near the top are inserted large tablets with the mystic words: "Om mane pemi hom," carved in high relief. As the inscription of course begins at opposite ends on each side, the Bhooteahs are careful in passing, that they do not trace the words backwards;* the left hand is always kept next to the Mendong when passing one.

An hour's walk along the banks of the Nyu river brought us to the ascent that leads to the last houses in the Kullait valley, 6,500 feet above the sea; at the houses we halted for the night, sending our men ahead to clear away the jungle, as the path from long disuse is reported as overgrown and impassable.

The path to-day passed over much gneiss rock, and occasionally large detached slabs of the same rock were seen; some of the blocks have minute garnets disseminated.

We had a neat little granary assigned to us as our quarters; the house stood upon high posts and was well stored with baskets full of ripe barley and wheat in the ear, also cotton; the walls were open mat work, and the heavens were visible through a scanty reed thatch; the whole room was nevertheless comfortable, dry and redolent of harvest. At sunset we had an audience of the Sirdar and of the villagers in general: we sat upon nice soft cushions provided by the Sirdar, stuffed with musk-deer hair and placed upon the bare rocks. We conversed through interpreters for some hours, principally about

* See Turner's Embassy to Tibet, pages 97, 98.

the unfortunate, because misguided, Rajah of Sikkim, about L'hassa, the grand Lama, the pass of Tumbok into Nepal, which we expected to reach the next day, and upon a variety of other subjects. The Sirdar showed with much amusing importance sundry Tibetan looking letters, stamped with the Rajah's vermillion seal, forbidding Cheeoong Lethoo, Sirdar of Singaleelah, to allow any one to pass either up or down the Tumbok pass; we told him it was impossible to retrace our steps, the fatigue we had undergone ascending and descending the steep mountains, amounting to 10,000 feet of descent and 17,500 feet of ascent in five days, the innumerable leech-bites we had received, amounting to several hundreds on each leg, the intolerable heat of the valleys, and the constant wading through the icy cold streams and from never being clothed in dry clothes had so knocked us up, that we were determined to enjoy a little of the cool breezes on the summit of Singaleelah; we informed him that if we found we could not get along the crest of Singaleelah we would return by the Kullait; this cheered him up amazingly; but when I told him that if I succeeded in cutting my way along the crest I should return by Pemionchi, his countenance fell; he begged of me not to risk my safety in going upon Singaleelah which, he declared, was a land of rocks and desolation, and a spot not fitted for man to wander in. Poor Cheeoong Lethoo sat the picture of despair at our obstinacy, and with the determination of a true Mongol he kept on passing and re-passing over his beardless chin and that with rapidity, a handsome pair of flat brass L'hassa beard-plucking pincers, ornamented with Tibetan characters, a violent jerk now and then proclaiming that a stray hair had actually been secured and rooted out; and to ascertain this comforting fact, the edge of the pincers were passed over his lips; the fact being satisfactorily settled to Cheeong's satisfaction that he had actually captured a solitary hair, another search was immediately taken in hand.

Amongst his other papers the Sirdar produced a picture about one foot in length, painted upon fine linen. It was from L'hassa, the drawing representing a great number of gods and goddesses, rivers, mountains, and a variety of confused and mystical subjects; on the back of the picture were the revered words "Om, a, hoom" in large bright vermillion letters. The picture, the Sirdar affirmed, cost

£50 sterling (500 rupees), and to it he appeared to attach much value; the mystic words as written

	om	Intelligence, arm, power	or God,
	ā	The word	
	hoom	The heart or love	

mean God; or as Le père Calmette in his "Lettres édifiantes," Tome 14th, page 9, says, "voici ce que j' appris de la religion du Thibet; "ils appellent, Dieu Koncioser, et ils semblent avoir quelque ide'e "de l'adorable Trinité car tantôt ils le nomment Koncikocick, Dieu "un; et tantôt Koncioksum, Dieu Trin. Ils se servent d'une espèce "de chapelet sur lequel ils prononcent ces paroles; Om, ha, hum. "Lorsqu'on leur en demande l'explication ils repondent que 'Om' "signifie intelligence ou bras, c'est à dire puissance; que 'ha,' est "la parole; que 'hum' est le cœur ou l'amour et que ces trois mots "signifient Dieu."

The Sirdar was a boy when Captain Weston came up the Kullait in 1822, to settle the boundary between Nepal and Sikkim at the head of the Kullait valley or at the Tumbok Pass. By the treaty of 1815, between Nepal and Sikkim, a large portiou of the Sikkim Hills and Morung that had been ceded to the British Government in perpetuity by the Nepaulese Court, and at the same time made over by the British Government in full sovereignty to the Sikkim Rajah, required to have the boundaries settled.

The Sirdar had also escorted Dr. Hooker from the Tumbok Pass to the Teesta river when returning from his tour in eastern Nepal in 1849, and at last consented to escort us to the summit of the Tumbook Pass.

Towards the close of the long talk, I made the Sirdar a present of money, and to every man, woman and child, amounting in all to thirty individuals, I distributed two, four and eight-anna silver coins; and in return, we were presented with a live kid, bamboo shoots, rice and plantains.

At this spot there are only two houses besides our little granary; in the house of the Sirdar nearly thirty people were accommodated during the night with food and lodging, men, women, and children all sleeping in the one room that constitutes the entire house.

Two miles north from the Sirdar's house, and several thousand feet below us, the Nyu and Kullait rivers unite, our route lay up the Nyu, the true Kullait valley from whence the river rises being too precipitous to attempt to reach Singaleelah by.

7th August, 1852.—Started at 7.30 A. M. up the valley of the Nyu with Cheeoong Lethoo, Sirdar, and an old merry Limboo with a long white beard, as our guides. The ascent was very steep, and the path had to be cleared the whole way, not having been used for three years; the principal underwood was ferns, polygona and a plant whose leaves are eaten as a spinach by the Lepchas. At 9 we reached a spot in the forest where stood the remains of an old guard-house built by our Sirdar's father, for the purpose of watching the movements of the Goorkas. From this spot, the greater part of the valley of the Kullait is visible: as we stood to take breath, the merry old Limboo, who was armed with a bow and quiver full of arrows and a very long and handsome knife, presented me with a pinch of snuff deliciously scented with pounded cloves, and contained in a neat horn mull. At 9.30 we entered a fine open forest of noble birch trees, the ground was free from underwood and nearly level. At the foot of many of the trees we saw the marks of wild hogs, deer, bears and wild dogs; green pigeons (koklah) we heard cooing overhead in the trees, and high over a neighbouring mountain a black eagle was seen soaring, and beneath him numerous swallows were flitting to and fro. In this forest we passed the remains of a hut in which Dr. Hooker had put up for the night in 1849, and close to which is another stone breastwork thrown right across the road. The denseness of the foliage of these forests, may be imagined from the fact that although a fine clear sun was shining overhead, not a ray could reach the ground along which we were travelling.

Our road now lay along the banks of the Nyu, a feeder of the Kullait, which rises at the Tumbook Pass, a foaming hill torrent about fifty feet broad with a cataract or miniature waterfall every twenty paces; the earth literally shook beneath the weight of the falling water.

Crossed the Tiksee at its junction with the Nyu, fording it with much difficulty from the fearful rapidity and strength of the descending water. The method of crossing these rapid streams, is to

send some of the steadiest and strongest men into the stream, who by the aid of poles manage to steady themselves and form a line completely across the stream with their faces towards the source; in front of this living barricade the weaker men, those heavily laden and travellers are passed safely over. At 12.15 P. M. crossed in a similar manner the Sikna; also at its junction with the Nyu, and at 12.45 P. M. crossed over to the left bank of the Nyu by a fallen tree.

Halted here for half an hour; the Barometer gave an elevation of 8,321 feet, Ther. 62° in the shade.

The rocks in the bed of the Nyu were almost entirely composed of gneiss of great beauty and fineness, consisting of white quartz, white, pink, green and rose felspar; golden, silvery and black mica; garnets, and in one specimen some beautiful actinolite of a pale green colour. At 4 P. M. we entered the region of Rhododendrons, associated with which I noticed tea trees in blossom, maple, Buccinicum hypericum in full blossom, Hydrangea, Daphne or paper-tree, numerous flowering shrubs and an underwood of the cheem bamboo of whose roasted tops, our Lepchas gave us a delicious feast in the evening. We pitched our tents in the Rhododendron forest on a small piece of level land named Tumbok, from whence the name of the Pass a few thousand feet above us. Our elevation was 9,660 feet, Ther. 67°, we have ascended 3,160 feet since the morning, leaving our tormentors, the leeches, at 7,000 feet. Few people who have not travelled in the forests of Sikkim can imagine the perfect repose we enjoyed when we got beyond the region of leeches; the incessant watching for these tormentors, the impossibility of standing still, or of even walking slowly when amongst them, is fatiguing in the extreme; all pleasure is destroyed; beautiful scenery, plants, flowers all are disregarded, in order to prevent a cluster of these loathsome creatures clinging round your ancles. Watching their movements, brushing them off, the continued sprinkling of dry snuff over the stockings, which is washed off again at every stream, is more than enough for the undivided attention of any one.

By observation I have learnt to save myself many hundreds of bites, but, I am sorry to say, at the expense of those with me; it is *never to walk behind any one*, but to lead the line, which always travels in Indian file. Immediately a footstep has touched the path

the leeches are roused and they spring up from under every leaf, from under every stone, and after two or more human beings have passed, the leeches are seen hurrying towards the path from the neighbouring bushes as far as eight and ten feet distant. When they reach the foot path they stand up perfectly rigid and quite ready to grasp the first foot that falls near them. A stranger would mistake the rigid little black things in the path for twigs or small pieces of wood. The person leading the line seldom gets bitten, the animals not being roused. During heavy rain, frost or bright sunshine the leeches do not appear; a cloudy or a moderately showery day is their liveliest time.

During the march, our guide took us off the road up a very steep bank to inspect a collection of wild bee-hives. After much scrambling and by the assistance of hooked sticks that were hooked on to the roots of the trees overhead, we managed to reach a narrow ledge with a deep valley in front of us. Immediately on our left and separated from us by a deep chasm, was a perpendicular wall of rock, over which a fine waterfall was pouring its full stream; almost within the reach of the water was a cave formed by an overhanging rock, from the roof of which depended twenty flat and black looking combs, three feet in length, covered with innumerable bees busy manufacturing their honey, while thousands were on the wing going and coming. The sight of these insects, only a few feet removed from where we stood, made me shudder; as it painfully brought to my mind a mad race, I was once made to run for miles down hill after having inadvertently disturbed a nest of these pugnacious little creatures. Besides being covered both on the head and hands with wounds, I had upon that occasion twenty-four stings removed from merely round my eyes. I therefore hastily made a sketch of the curious group, and descended from the ledge as fast as possible. These bee-hives are the property of the Sikkim Rajah; the wax is taken once a year by smoking the bees out, and yields him a revenue of ninety rupees per annum. The honey is eaten by the wax collector or thrown away.

8*th August*, 1852.—An hour and a half of sharp climbing carried us to the summit of Singaleelah* where the Tumbok Pass leads

* Means "Birch tree."

from Sikkim into Nepal. Barometer gave an elevation of 10,792 feet, Thermometer 64°.

On our way up we were shown two rocks between which the narrow footpath runs; and where our guide informed us that a stout Nepalese Soubah, who was travelling in this direction, was unable, without great manœuvering, to force his portly personage, much to the merriment of his followers and of Cheeoong Lethoo Sirdar, who related the story, as we halted for breath, with great gusto.

At 10,000 feet we fell in with the pale-coloured leech that inhabits this elevation, but, as they are scarce and sluggish, we paid little heed to them.

The Tumbok Pass is a depression in the Singaleelah range flanked on either side by high mountains, that to the south "Melido" or "Singaleelah" is four miles distant and rises to 12,329 W. feet;* that to the north, distant two miles, is nameless and is about 12,000 feet in height. The immediate summit of the Pass is destitute of trees, the forest being for two or three hundred yards on each side of the footpath replaced by grassy banks and slopes covered with a bright assemblage of purple geraniums, white roses, primrose, everlasting chrysanthemum of a buff colour, lily of the valley, forget-me-not, thistle, numerous pretty wild flowers whose names I am unacquainted with, a large white Passion flower-looking creeper, hemlock, holly, raspberry, arums, campanula, two kinds of buccinium, ferns, lichens, mosses, grass, carex, fennel, dock, ranunculus, anemone, a shrub bearing an elegant cluster of red bells, and a delicate lily-of-the-valley-looking plant bearing a pink or white cluster of minute bells. The trees near at hand were arboreous rhododendron, maple, a mimosa-looking tree, bearing a cluster of brown berries (Pyrus Americana?) and several others; wild garlic grows in great abundance with a very beautiful purple flower; this herb was gathered in large quantities and consumed by the Lepchas.

A few feet below the summit of the Pass on the Nepal side, there is a deep black looking tarn surrounded by such deep forest that we could not conveniently get to it. The Sirdar and coolies all held

* W. When applied to heights, indicates heights ascertained by Colonel Waugh, Surveyor General.

up their hands in the attitude of prayer when they saw the water, and remained in that position muttering to themselves for several minutes.

The Sirdar after showing us the cairn of stones erected by Captain C. T. G. Weston in 1822, (?) and having shown us the boundary between Nepal and Sikkim, took his leave and returned home, taking with him as presents a pair of scissors, a sharp scalpel, a penknife, a quantity of gunpowder and shot, and a bottle of brandy.

On the cairn of stones are three carved slabs of gneiss, the carvings representing Boodh in the attitude of meditation, and several other Hindoo gods and some very indistinct figures, none of which were visible until I had destroyed, with boiling water, a very tough and flat lichen, that had spread over the whole of the slabs.

On a slab of flinty slate, we engraved our names and date of visit.

The view looking into Nepal is extensive and very beautiful, the spurs of almost all the mountains up to 5000 feet being much more cleared and cultivated than those in Sikkim, bespeaking a denser population. The grandeur of the view, looking back the way we had come or to the east, can hardly be described in words. The eastern snowy range was out in all its glory; there was not a cloud to obscure a single peak. Gipmochee 14,509 W. was bare of snow; Cholah 17,319 W. was covered with snow for about 1000 feet; further north all was one wintery scene of snow, and the lofty Chumalari 23,929 W. distant 80 miles and far in Thibet, towered over all the peaks in advance of him. I have given a slight sketch of this mountain upon the accompanying map, as it appears from the Tumbok Pass. To the north, nothing was visible but the sharply pointed and snowy peak, Nursing 19,139 W. distant 23 miles and covered with perpetual snow, the higher crest of Singaleelah shutting out our view to the north.

The valley of the Kullait from its great depth appeared bathed in a cobalt tinge; Hee, Tendong and many other fine mountains seen from Darjeeling were now seen in flank by us; and on our right a fine waterfall, the source of the Nyu, was dashing down the fir clad Melida mountain which is 12,329 feet in height.

Our tent was pitched upon a bed of geraniums in full flower, thousands of whose pretty blossoms were trodden under foot. Gad-

flies of a large size were very abundant, but they gave us no trouble beyond an occasional bite.

As we had had only a very short march and intending to remain all day on the Pass, the Lepchas commenced playing hop-step and a jump; running races, jumping distances and playing all sorts of tricks, like so many good-natured school-boys; whilst the Nepalese Hindoo coolies shrunk away to sleep under the trees.

The Lepcha is a most desirable companion in travelling, neither heat nor rain nor cold, nor any thing else appears to ruffle his even temper. I have travelled with them in the height of the rains when for fifteen days they never had a dry stitch of clothes on their backs, and yet no word of murmur was ever heard from their lips. They travelled the whole of these days through drenching rain, carrying heavy burdens; and at night often in vain endeavouring to dry their clothes, their legs streaming with blood, they would without a murmur, but with much laughing and joking, lie down on the wet ground under a cotton covering, stretched upon two poles, and sleep till the morning.

During the night I heard the hooting of owls; bats and shrews were also heard. I procured a very handsome speckled crow with a white and black tail; small birds were very scarce.

9th August, 1852.—Direction north along the crest of Singaleelah. The morning was most lovely, the air pure and transparent and the temperature delicious; although this trip has been undertaken in the height of the rains, we have as yet only had a few showers since leaving Darjeeling.

The same beautiful view that we had sat for hours enjoying the evening before was still before us; Chumalari towering over every thing. This singular, isolated mountain was recognized this morning by several of my Lepchas who had been to Phari at its base.

As we proceeded we noticed a bank of snow-white clouds twenty miles in length and twelve thousand feet in height, impelled by the full force of the most southwest monsoon rolling up the eastern flank of the eastern snowy range, and as the clouds poured over the western side upon the lower hills of Sikkim, it had the exact appearance of an extensive cataract pouring over the mountains into the deep valley of the Teesta river; a cataract twenty miles long and 12,000 feet in height; it was a glorious sight.

As we ascended the grassy knoll that overhung our tents, the snowy range of Nepal was revealed to our sight, with all its attendant beauties of deep valleys and blue mountains for a foreground. For three and a half hours we had to cut our way through a forest of rhododendrons, red currant trees in full fruit though not ripe, maple, juniper, birch, white rose, cherry trees in full fruit, with an underwood of Aconitum palmatum or bikh, the root of which is a deadly poison, and of which our Lepchas dug up a quantity ; a purple-flowered garlic, many beautiful flowers, the forget-me-not, the poppy-like garnet-coloured and yellow mecanopsis, and a great variety of wild flowers. The roots of this deadly aconitum are collected by the hill-men (Puharias) I believe in the spring, and exported to Calcutta and to other places, where it sells for one rupee the seer. Its uses were laughingly described to me by my merry Lepcha guide, as "useful to sportsmen for destroying elephants and tigers, useful to the rich for putting troublesome relations out of the way, and useful to jealous husbands for the purpose of destroying faithless wives."

Its poisonous power is so great that a Lepcha died at Darjeeling, some months ago, who when crossing the hot valleys had allowed the root which was carried across his shoulder in an open cane-basket, to rub against his moist naked body ; during this time he imbibed through the pores of the skin sufficient of the poisonous principle to cause his death.

At 10 A. M. we arrived at a grassy spot, where the remains of a Gurung's house stood. The Gurungs are a pastoral race of Hindoos residing in Nepal, who, during the summer, drive up to the base of the snows large flocks of sheep, where they depasture the grass found as high as 14,000 feet, and gradually retreat to lower elevations as the summer draws to a close.

From this spot we found a good footpath leading along the crest of Singaleelah ; we had passed over five high peaks and now stood upon a very high one with immense blocks of moss-capped gneiss protruding through the soil ; which latter was a carpet of beautiful flowers, the pretty Veronica predominating. Halted an hour to breakfast and to rest and at 11 A. M. commenced the ascent of Sughoo mountain, passing through a forest of small rhododendrons

of many kinds, only one of which was in blossom, bearing a small purple flower three quarters of an inch across, and with a leaf only one quarter of an inch in length, I also saw a quantity of a bright yellow heartsease. Reached the summit of Sughoo at noon, from whence we commenced descending, and halted for the night under some fine large cherry trees at an elevation of 11,458 feet, Ther. 65°, 1 P. M. Sughoo is the culminant point of the great Pemionchi spur that ends in the great Rungeet, and which spur is sixteen miles in length from west to east. Its western extremity being 1,200 feet above the sea, and its eastern extremity about 2,000 only.

We were now sixteen miles from the perpetual snow line, but could see nothing, as we were enveloped in a thick cloud.

(*To be continued.*)

Note on the Ruins at Maunkyala,—by Major James Abbott, *Boundary Commissioner, Punjab.*

My tent being pitched at the tope of Maunkyala on 7th April last, I set out to examine more particularly the village and its neighbourhood. For although I had previously visited the spot more than once, I could learn of the villagers nothing confirmatory of the report, which places several smaller topes in that neighbourhood, and which would make it the site of a city that has since disappeared. During the morning several zemindars came to visit me. They, as usual, denied the existence of any other topes than the principal; but allowed that near the village of Maunkyala, building stones occurred in great number at the depth of from three to seven feet. My first object was to visit one of the diggings for such stones. It occurred on the south-west of the village, distant from it about one hundred and fifty yards. The depth at which the stones occurred was about five feet, the super-incumbent soil being a sandy clay, manured from the village. I was informed that the same occurs on digging at any portion of the village glacis; by which I mean that land which is manured from the village.

The village, as at present it exists, contains about eighty houses closely congregated together, and built entirely of the debris of the

ancient habitations. The space in which these building materials occur may be an area half or three quarters of a mile in circuit, a space which might have contained a good-sized village of two or three hundred houses. A street occurs in the village paved with massive slabs. But as this is at the very summit of the tumulus upon which the village stands, it may have been made since the destruction of the original buildings. Outside the village, however, on the north-west, the paved street appears to be original; for on one side are the remains of a foundation elaborately constructed of squared stone without cement, but accurately fitted together.

This village occupies an elevated site partly natural, partly artificial, about four hundred yards north of the Maunkyala Tope. No one, on examining superficially this site, could conjecture that beneath it are the ruins abovementioned. The soil shows no admixture with particles of brick, pottery or building stone. It appears like the natural undisturbed soil of the country.

The stones which lie beneath the soil are of two kinds, the common unsquared building stone, of which houses are built in this neighbourhood, and large slabs of sandstone carefully squared, some of them from two to four feet in length by a cubit in breadth. These occur in such numbers as to leave no doubt that a considerable building has here existed, very different in structure from the dwelling houses of the present century.

On carefully observing the surface of the neighbourhood, several mounds are apparent, which, on examination, prove to be the ruins of religious or sepulchral edifices. All of these have, I believe, been violated by that antiquarian frensy which spares neither religion nor piety, but rudely spoils alike the sepulchre and the shrine, to gratify the avarice of curiosity or of ambition. This sacrilege cannot be too much execrated. The veneration which attaches to sepulchres is so closely interwoven with religion, that its demolition endangers interests the most sacred to humanity. If we can warp our hearts to take delight in plundering the dead, how shall we respect the rights of the living?—that solemn, time-honored legion who have preceded us to the unknown shore, who have explored for us the mystic path, who have dared the perils of regions without a name, that we might profit by their success or their error, and

tread more confidently the mazes of eternity. How can we reconcile it with our conscience, with our principles, with our feelings, to drag their dust forth rudely from the tomb, or to mutilate and deface those sacred monuments which were hallowed to their hearts by association with the Author of all good? Do we rob them because they have none to act as champions for them, because there is none to call us to account? to sue us at law? If so, it is a cowardly and an unmanly plea.

The number of these mutilated monuments I reckoned to be eight or nine, but there may be others which I did not observe. Several of these have been regular topes, though now for the most part despoiled of their squared stone: a fate from which the main tope has been saved, only by the cumbrous weight of its materials.

There are also a large number of wells in this neighbourhood, frequently of oblong figure and lined with squared stones. Each of these wells may have belonged to some shrine, or have been dug as a votive offering to the religion of the spot.

We have now no means of ascertaining the traditions of Maunkyala. We know not whether the supposed sanctity of the spot led to the erection of the main tope, or whether it was the consequence of the existence there, of so considerable a shrine. But whatever the cause, it has led to the erection of many such shrines or sepulchres, and to the excavation of many wells.

The Boodhists evidently delighted in water. As their religion seems to have emanated from the worship of Fire: so water, as one of the elements, seems to have been necessary to their ritual, and is found in either tank or well at all of their shrines. Many of those at Maunkyala may have been gifts to the main shrine; others belong to separate shrines of which the vestiges remain: and others may have been the work of votaries, to whom in consequence of the scarcity of water at that spot, the work had been enjoined by the priests. My small camp, of less than forty persons, daily exhausted the principal well. A few of these wells may have been designed for irrigation.

From a careful examination of the spot, I cannot see any evidence of the existence here of a city. The area occupied by submerged ruins would not have comprised a very considerable village: whilst

the comparatively large number of wrought stones, denotes some costly structure which might have occupied the entire site. I rather incline to think these, the ruins of the monastery of Maiukialan described by Hiang Tsang as existing in the 6th century.

It is probable that every considerable tope was the shrine of a neighbouring monastery, where were deposited the relics of each saint of the order, as he died. The original villages of this estate may be those which still exist there: and Maunkyala itself as a village may be altogether posterior to the ruin of the monastery from the debris of which it is erected.

The arguments upon which some writers have attempted to prove the modern village of Tukhtpurri to be the ancient Taxila refute themselves. It is asserted that Tukhtpurri *is* Taxila, because at the distance of six miles, viz. at Maunkyala are the ruins of a large city. Were this the case, Maunkyala might be Taxila. But in the name Maunkyala, we have no resemblance to that of Taxila; and at Tukhtpurri, which has some resemblance to the name sought, we have no ruins at all. The two places have no connection whatever, the one with the other. Tukhtpurri has no Boodhistic remains, but is built on the site of a modern Gukkur village, a mile off the high road.

Whatever the origin of the veneration felt by Boodhists for the site of Maunkyala, we find it taken up and adopted by the Gukkur princes of the Dhangulli branch, who have established their cemetery about four miles to westward of the tope, in a spot remarkable for a rock of the sandstone formation, which there crops out of the soil in the figure of a natural wall.

J. Abbott.

P. S.—At Maunkyala very few Bactro or Scytho Greek coins are found; but from the little town of Mulpoor, distant three or four miles, some were brought me, which appear to have been received by Kuttries from the peasantry who find them in old village sites. Of these I observed the following:—

The dregs of the copper coinage of the Kanerkean Dynasty,	many
Soter Megas,	a few
Ayas,	a few

The copper coin which appears to belong to the Cashmerian Dynasties of Indo-Greeks, but is common also in the Sind Sagur Doaba,	many
Copper coinage of Baraoro,	a few
The coins of Sri Ram,	a few

The prevailing coin at Mulpoor is a minute bronze coin, worth about half a farthing, having on one side a rude image of Kadphises or Kanerkes, and on the other what appears intended for a figure of plenty seated. I have not met with it elsewhere.

I have visited Maunkyala several times, but have found very few coins or relics in that neighbourhood.

Literary Intelligence.

The 2nd No. (vol. vii.) of the 'Zeitschrift' of the German Oriental Society contains the first half of a paper by Professor Neumann on early Chinese civilization. Dr. Grotefeud criticises Col. Rawlinson's reading of the Behistun inscriptions. Dr. Max Müller notices the first portion of Dr. Ballantyne's Edition of the Mahábháshya. There is a paper by Dr. Hitzig on Gazzali's Ihja-ulum-al-din, and another by Dr. Grotefend Piper on the I-king of Confucius.

Among the notices, there is a communication from Dr. Weber of Berlin, exposing another fictitious publication similar to that of St. Croix in 1778. Some Danish missionaries imposed on by a Tranquebar Brahmin published in the Missions berichte aus Ostindien (Halle 1742) a paper entitled, 'Au abstract of the Yadsur Vedam, one of the four Law-books of the Brahmins.' There is also a criticism of Pertsch's Chronicle of the family of Rajah Krishna Chaudra of Nuddeah, just published at Berlin. The Catalogues of MSS. in the Berliu and Leyden Libraries, which are the subject of two other interesting notices, will be more particularly mentioned hereafter.

An Oriental Society has been founded at Constantinople. Its members already number forty, and its first meeting was held on the 11th February last. The Journal commenced by M. Cayol, is henceforward to appear under the Society's auspices.

The 3rd No. of the same publication contains but three papers. Dr. Max Müller concludes his contributions to the knowledge of Indian philosophy, a paper commenced some time ago. Dr. Haug begins an article which will be welcome to Zend students; he gives a translation of and commentary on the forty-fourth Chapter of the Yaçna. The third paper is by Professor Dillmann on the History of the Kingdom of Abyssinia.

Among the notices, is a very interesting one, by Professor Lassen, of the translation just published by Julien of the Life and Travels, in India, of Hiouen Thsang; the first vol. of the work is daily expected from Europe.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR SEPTEMBER, 1853.

The Society met on the 7th instant at the usual hour.

J. R. COLVIN, Esq. V. P., in the Chair.

Dr. Porter was introduced as a Visitor by Dr. A. Sprenger.

The proceedings of the last month were read and confirmed.

The accounts and vouchers for the month of July were laid on the table.

Donations were announced:—

1st.—From J. A. Cockburn, Esq. Superintendent, Barrackpore Park: The Carcass of a Leopard, *Felis leopardus.*

2nd.—From Mon. C. Holmboe, Secretary of the Royal University of Christiana: The latest publications of the University as per list in the Library Report.

3rd.—From Hodgson Pratt, Esq. Officiating Under-Secretary to the Government of Bengal, specimens of copper smelted in Dhulbhoom, a district in the South West Frontier Agency, together with reports on the quality of the same by the Assay and Mint Masters.

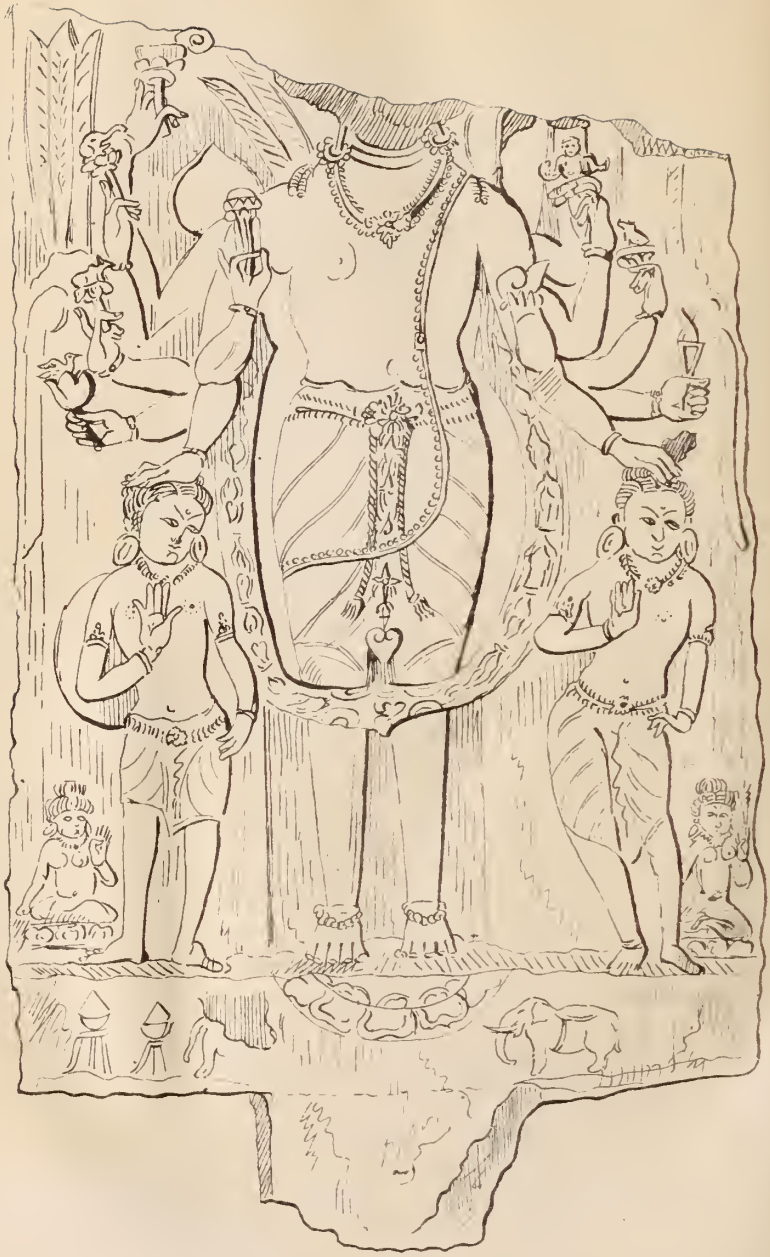
The following is an extract from the Assay Master's report.

"I have the honor to report that their (the specimens') pure contents are as under:

No. 1	90 per cent.
No. 2	88 ditto ditto;

they both contain sulphur and iron, and seem to be fair specimens of metal imperfectly refined."

The Mint Master adds that on trial at the laminating rollers of the Mint both specimens were found unmalleable.



Remains of a 12 armed Idol found on the Site of an ancient City built by Rajah Mŭhee Pāl at Ghyasabad near Moorshedabad.

Asiatic Lith. Press.

4th.—From Captain Layard, two slabs of basalt inscribed with Páli characters.

The following is an extract from Captain L.'s letter:

"I yesterday put on board a boat belonging to Messrs. J. and R. Watson which leaves Berhampore this morning, two stones from Ghysabad, on which you will distinguish a few characters *apparently* Páli in shape. I have had the stones much reduced in size, as they were over-large and heavy for carriage; but this cutting has in no way interferred with the inscriptions on them. I may again mention that the stones were built into rude steps leading up to a small Durgah, in which is said to be the tomb of Sultan Ghyas-ood-deen. The ground near the Durgah is covered with the debris of an ancient Hindu temple of Tribeni. I doubt the tomb at Ghysabad being that of Ghyas-ood-deen. One Ghyas-ood-deen reigned A. H. 769 and was buried with his two sons Zayn-oolab ideen and Wahaz-ood-deen at Peroa in a mosque called the Eklakhee. Among the early conquerors of Bengal I find a Sultan "Hœsam-ood-deen avuz Ghyas-ood-deen;" but he was killed near Gour in battle, by Nassir-ood-deen (the prince reigned in 609, A. H.), and was probably buried on the spot. It was near the Durgah that the small gold coins were found, which I sent to you last cold weather; others have been found lately. A twelve-armed figure, of which the enclosed is a sketch, was found during the last dry season in the bed of an old tank. The carving is rude and unfinished, and the figure here and there defective, as you may perceive. In the hand holding the sacred shell, I fancy the idol must represent Vishnu or rather his incarnation, as I know of no twelve-armed god amongst the numberless Hindu deities, nor can any pundit here enlighten me! You will see that the hands hold the saw, the boar, the lotus, a bird, a half human figure, an elephant's head, a shell and some undistinguishable object, imperfect on the stone. I have not sent the idol, as it is, as you see, mutilated (of course by Kala Pahar), but will do so if you think it worth preserving in the Museum. I think I mentioned to you before, that the country inland around Ghysabad bespeaks the site of an ancient Hindu city; numerous dry tanks, blocks of black stone, broken bricks and pottery, with the remains of fountains and roads, are every where to be seen. The name of the city I could not discover, but it is

said to have been founded by Rajáh Muhee Pál. This Rajáh may have been one of the successors of Sumoodru Pál, the Yogee, who followed Vikrama Sen and his son Vikramaditya."

It was proposed by the Council that Captain Layard should be thanked for the two inscriptions and requested to forward, to the Museum, the twelve-armed figure mentioned in his letter.

5th.—From Bábu Rádhánáth Shikdár through Capt. Thuillier, Deputy Surveyor General, Meteorological Registers kept at the Surveyor General's Office, Calcutta, for Jauuary and February last.

Mr. Woodrow proposed that measures be taken to procure a return of the fall of rain at places such as Cherra Punjee and Darjeeling.

Ordered that the Secretary have extracts taken from the Registers in the Office of the Medical Board to be published in a condensed form in the Journal of the Society.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members:

Captain J. C. Haughton, 54th N. I.

George A. Plowden, Esq. C. S.

Lieut. C. H. Dickens, Bengal Artillery.

The Council submitted the following reports.

1st.—Recommending the publication of the Suryya Siddhánta in the Bibliotheca Indica, under the editorship of Mr. E. Hall.

2ud.—Submitting, for confirmation, draft of a rule for regulating the circulation and retention, by members, of books from the library.

The rule is as follows:—

"All books, plates, &c. taken from the library by parties resident within twenty miles from Calcutta, to be returned for inspection by the 1st January in each year, and to be returnable on the Librarian's demand at the end of three months from date of issue. Where however the books, &c. may not be required for loan to another applicant, they may be retained on re-application for successive periods of three months till the end of the year.

"These applications shall certify to the books, &c. being forthcoming and in good order; and in future the receipt for delivery of all library works shall contain the valuation of the work borrowed according to the Librarian's valuation Catalogue. Books taken by

parties resident beyond twenty miles from Calcutta to be returnable on demand, at the end of three months from the date of issue as above provided, but the Council may, in regard to books issued to such parties, dispense with their actual return by the 1st January in each year, on being satisfied that the books are in good order, and that the Society is not likely to suffer by their not being recalled to the library.

"In order to carry out the valuation part of these provisions, the Committee desire that the Librarian will commence immediately on the systematic valuation of the whole library, and proceed therewith gradually under the direction of the Secretaries until the valuation be complete as to all the printed works."

Resolved that the recommendations of the Council be adopted.

Read letters:—

6th.—From J. J. Gray, Esq. Goamaty, Maldah, announcing that he has obtained a MS. copy of the History of Bengal by Gholam Hosein entitled "Ryaz-us-Saláteen" and promising to send it to the Society.

7th.—From Dr. Fayrer, Rangoon, forwarding copies of Meteorological Registers kept at the Rangoon Field Hospital, for the months of May and June, 1853.

8th.—From Hodgson Pratt, Esq. Officiating Under-Secretary to the Government of Bengal, enclosing correspondence on the subject of iron found in the Raneegunge district.

9th.—From Captain J. C. Haughton, Cheybassa, submitting the following note on a ruined city in Singbhoom.—

"In No. 103 (Vol. IX. p. 694 et seq.) of the Asiatic Society's Journal for 1840 is a note by the late Mr. Torrens, appended to Capt. Tickell's memoir on the Colehan, soliciting further information regarding the antiquities of Singhbhoom, and, in No. 186 of 1848, a native report of the existence of a ruined city in this quarter is noticed. Having traversed Singhbhoom in almost every direction, I am able to furnish some negative information on the subject, which I now offer for those who take an interest in the question.

"The only remains in the country, known to me, which have any pretensions to antiquity are those at Benee Sagur, Kèsna and Nagra. The two former places have been noticed by Capt. Tickell and

do not, in my opinion, merit particular consideration. Capt. Tickell is said to have sent the Society a gold coin from Kèsna, but I could not learn that any other of gold, silver, or copper had ever been found at Kèsna, Benee Sagar, or Nagra. The offer of a reward produced some small thorn-like pieces of gold, a portion of a gold ring and some stone beads at Kèsna, but elsewhere nothing.

"At Nagra, twenty-three miles S. S. E. from Chyebassa, in the jungles, are some heaps of brick in fragments, spread over a sufficient extent to warrant the supposition, that a town of moderate size once existed there. The remains of a stone-lined tank would indicate some wealth and civilization, but the ruins afford no defineable trace of temple or other building. The former inhabitants of the Purgunnah having been expelled in modern times by the Coles, there is now no local tradition regarding the place. Trees of a century or two's growth flourish on the spot.

"I had some hope that information as to these ancient towns might be gleaned from the Bunsawullee of the Raja of Porahat, or from the local Pundits, but my enquiries have not been attended with success.

"I conclude that if any ruins of importance exist in this direction, they are to be looked for further South in Mohrbunj or Keunjer. The nearest known to me are those of Kiching in Keunjer, and in the opposite direction at various places in Sirgooja, about one hundred miles to the N. W. of this."

10th.—Read extract from a private letter from Col. Rawlinson, dated Baghdad, 5th July, 1853, containing allusions of interest to the progress of his researches in Assyrian Antiquities.

The Librarian and the Curator of the Zoological Department of the Museum submitted their usual monthly reports.

Read and confirmed. *October 5th*, 1853.

(Signed) J. R. Colvin.

Report of Curator, Zoological Department, for August Meeting.

1. W. Theobald, Esq. Jr., late of the Punjab Salt Range Survey, has favoured the Society with a collection of mammalia and birds chiefly obtained in the Salt Range, with also a few skins from Kashmir.

The mammalia consist of Pteropus edulis (v. *Edwardsii)*, Myotis

PALLIDIVENTRIS, (Hodgson),* in spirit, "from limestone caves near Matar Nag, N. of Islamabad" (Kashmir),—VULPES FLAVESCENS (?), Gray,†—HERPESTES NYULA, Hodgson, var. (with bright rufous face and tail-tip),‡—H. AUROPUNCTATUS, Hodgson,—FELIS CHAUS, Guld. (v. *Jacquemontii*, Is. Geoff., &c.),—F. HUTTONI, nobis, *J. A. S.* XV, 169,§—ERINACEUS

* Extremely close to the European M. PIPISTRELLUS, but may readily be distinguished by the much greater length of the fore-thumb, which, with its claw, measures nearly $\frac{1}{4}$ in. (not following the curvature of the claw). The general hue of fur of the upper-parts appears to run greyer or less fulvous, and of the under-parts to be more albescent, than in the European Pipistrelle; but there may be considerable variation of shades of colour. Capt. Hutton's Masuri Pipistrelle (*J. A. S.* XXI, 360), is again distinct, being of a much darker colour than the two others, and it is especially characterized by the diminutive size of the foot, which, with claws, scarcely exceeds $\frac{3}{16}$ in.,—MYOTIS PARVIPES, nobis, *n. s.* In other respects the three species are very closely affined.

† Much brighter-coloured than Afghan specimens, and the tints purer and more strongly contrasted; the legs much paler, or more rufescent and less nigrescent, than in the larger V. MONTANUS of the sub-Himalayas generally. Size, and the proportions of skull, the same as in the Fox of Afghanistan and Persia.

‡ Mr. Gray has recently noticed two *Herpestidine* animals from Ceylon (*Ann. Mag. N. H.*, July, 1853, p. 47). One, his HERPESTES SMITHII, *Mag. Nat. Hist.* 1837, II, 578,=*H. rubiginosus*, Kelaart, v. *Ellioti*, nobis, *J. A. S.* XX, 162, 184, XXI, 348, and inhabits also the Nilgiris and Travancore. The other, CYNICTIS MACARTHIÆ, Gray (*loc. cit.*), does not seem to be H. FULVESCENS (v. *flavidens*), Kelaart, *J. A. S.* XX, 162, 184, XXI, 348; but may nevertheless prove to be no other. A CYNICTIS, however, should have no fifth toe to the hind-foot, which exists in H FULVESCENS.

§ This seems to be the same small Cat, affined to the domestic races, as that of which an imperfect skin was procured by Capt. Thomas Hutton at Kandahar; but the fur of Capt. Hutton's specimen is much longer, indicating probably the winter vesture, whereas Mr. Theobald's specimen has short fur, and might well pass for a variety of the domestic Cat, which perhaps it is. I incline, however, to the opinion that it is probably one of several wild types which have merged in domestication to produce the domestic Cat. Now the resemblance of the domestic Cat of Bengal, and I believe of India generally (if not also of Egypt, Barbary, and even Spain?), to the wild F. MANICULATA, Rüppell, is most manifest; but this is far from being the case with the tame Cats of northern Europe, the resemblance of which to the European wild Cat (F. SYLVESTRIS, Aldrovand,) becomes much stronger to an eye familiarized with the appearance of the domestic Cats of India, than to that of an observer unacquainted with the latter. It is not probable that

COLLARIS, Gray, Hardw. *Ill. Ind. Zool.*,*—SCIURUS PALMARUM, L. *(verus)*, —MUS DUBIUS, Hodgson (apparently, from Aliábad Serai, top of Pir

F. SYLVESTRIS has more than contributed to the production of the domestic breed of northern Europe; yet sufficiently to have influenced the characters of that breed, by frequent intermixture probably in times when the domestic Cat was introduced and continued rare, while F. SYLVESTRIS was far more abundant than at present. The domestic Cats of India interbreed occasionally with F. CHAUS, and also with F. RUBIGINOSA of the Coromandel coast and Ceylon, as I have been assured by Mr. Walter Elliot (vide *J. A. S.* XVII, 247, 559).—Since the preceding note was penned, I have received the following notice from Mr. Theobald, in answer to some enquiries which I made of him.—"The FELIS HUTTONI is one of the three common wild Cats well known to *Shikáris* in the Salt Range, —viz. F. HUTTONI, F. CHAUS, and a large black species which I have not seen. I also shot one which is similar to, but, I think, smaller than F. CHAUS: I have only, however, the head of it."—The word "black" here probably refers merely to a dark colour.—"I should add that the F. HUTTONI has red eyes."

* The species is founded on the figure cited, and has never been described. General Hardwicke's specimen was from the Doab. Capt. Hutton's Hedgehog from Buhawulpur *(J. A. S.* XIV, 351), referred dubiously to E. COLLARIS, is probably distinct and new. Mr. Gray's British Museum specimen, from "Madras," presented by Mr. Walter Elliot, is probably E. MICROPUS, nobis *(J. A. S.* XV, 170), from the Nilgiris; whence also the example in the Society's museum, the locality of which is stated to have been unknown, *loc. cit.* (vide *J. A. S.* V, 191); and this southern species, though proximately affined to E. COLLARIS, is very obviously distinct from it. Perhaps, however, Capt. Hutton's third specimen of supposed COLLARIS *(J. A. S.* XIV, 351,) may be no other, as formerly suggested (in XV, 570). It is by no means probable that a second species of Hedgehog inhabits the Nilgiris. In Nepal, Mr. Hodgson enumerates three species of this genus, E. SPATANGUS and E. GRAYI of Bennet, and E. COLLARIS, Gray (*Calc. Journ. Nat. Hist.* IV, 288). In Capt. Hutton's supposed E. COLLARIS from Buhawulpur, the quills were "white on the basal half, and jet-black on the upper half;" in Mr. Theobald's three specimens from the Punjab Salt Range, the quills have their terminal third black, also the extreme base, and the rest whitish with a broad dusky ring, about equal to each whitish ring above and below it. In other respects they accord, as well as can be made out, with Hardwicke's figure. Unfortunately, there are no skulls with them (though one has since been promised by Mr. Theobald); and one of the skins is too much injured to be of any use, though the other two have been mounted. Length of tarsus, to tips of claws, 1¼ in. Mr. Gray also mentions an ERINACEUS MENTALIS, Black-chinned Hedgehog," from the Himalaya: but with this we are wholly unacquainted.

Panjal Pass), *—M. Theobaldi, nobis, *n. s.*,†—Hystrix hirsutirostris, Brandt (*H. leucurus*, Sykes), 2 skulls,—Ovis Vignei, nobis, skins of old female and of young male, also some skulls and frontlets,—Capra sakin, (the Himalayan Ibex), skull of a female,—Gazella cora, H. Smith (*H. Bennettii*, Sykes), skull and horns of male,—and skulls of Sus indicus, Gray.

The most interesting of the birds are a specimen of the recently described Nucifraga multimaculata, Gould, from Kashmir,—ditto of the *Seesee* Partridge, Ammoperdix Bonhami, from the Panjab Salt Range,—a small Bunting, Euspiza, perhaps new,‡—a new Mirafra, sent entire in spirit, as also a skin,§—Accentor atrogularis, nobis,—and Corydalla rufula, (Jerdon); the last being a species which was discovered on the Nilgiris, but whose chief range would now appear to be the N. W. Himalaya.

Also a fresh-water Crab (Thelpheusa).

3. Fulwar Skipwith, Esq., C. S. Skin of Rhizomys pruinosus, nobis, *J. A. S.* XX, 519, from Sylhet.

* The same Mouse, to all appearance, as one sent by Capt. Sherwill from Darjiling (*ante*. p. 409); but certainly not the young of M. urbanus, Hodgson, the description of which seems to indicate the M. Manei, Gray, or common House Mouse of all India.

† Like M. gerbillinus, nobis (*ante* p. 410); but larger, with comparatively shorter tail and larger feet. Dimensions of an adult female.—Length of head and body 2⅞ in.; tail 2⅝ in.; ears ½ in.; tarse and toes $\frac{11}{16}$ in.

‡ Euspiza, female. Length 5⅛ in.; of wing nearly 3 in.; and tail 2¼ in. Brown, with narrow medial dusky streaks to coronal feathers, and a conspicuous pale narrow supercilium: shoulder of wing and margins of the alars deep maronne-brown: lower parts rufescent, streakless. Legs pale.

§ M. phœnicuroides, nobis. Affined to M. phœnicura, Franklin, but the general hue less rufescent; the under-parts pale fulvous-grey, albescent on throat; tail brown, faintly rufescent at its extreme base, and on the exterior web of the outermost feather; broad margins to inner webs of the primaries and secondaries, with the axillaries, also pale rufescent, imparting this hue to the inner surface of the wing. Wing 3⅞ in., the short first primary 1⅛ in., and 1⅝ in. shorter than the second, which is ¼ in. less than the next three, which are equal. Tail 2¾ in.; bill to gape ⅝ in.; tarse ⅞ in.; and hind-claw $\frac{5}{16}$ in. Hab. Kashmir.

There are also the wings and feet of a large female Carpodacus (apparently); the wings measuring 4⅝ in., with tertiaries 1⅜ in. shorter than the primaries; and tarse 1 in.

4. Capt. M. Turnbull. A fresh specimen of SCIURUS HYPOLEUCOS, Horsf., "from the Straits." Sumatra is the habitat of this species; and not Madagascar, as stated by Col. Hamilton Smith, in his volume on mammalia in the 'Naturalist's Library.' It belongs to the true S. E. Asiatic type of gigantic Squirrels.

5. Mr. J. Harley. A dead LORIUS DOMICELLA.

6. From Barrackpore. Dead specimens of NYCTICEBUS TARDIGRADUS, HYSTRIX BENGALENSIS, and PHASIANUS TORQUATUS.

7. From myself. Various specimens in spirit procured by C. S. Bowring, Esq., in Hongkong. Among them is a small Bat, which is probably SCOTOPHILUS IRRETITUS (*Vespertilio irretitus*, Cantor, *Ann. Nat. Hist.* IX, 481). Form typical, with two pairs of permanent upper incisors. Entire length of female $3\frac{1}{8}$ in., of which tail $1\frac{1}{8}$ in. Expanse $8\frac{1}{8}$ in. Forearm $1\frac{5}{16}$ in. Tarse $\frac{2}{16}$ in. Ears (posteriorly) $\frac{3}{8}$ in. Colour brown-black, with slight pale tips to the fur of the upper-parts; below somewhat less deep-coloured, with the pale tips to the fur more developed, and towards the vent and base of thighs the prevailing hue is whitish. Ears, limbs and membranes uniformly blackish. V. IRRETITUS from Chusan, as described by Dr. Cantor, accords in dimensions; but the fur of the upper-parts is given as "soft brownish-grey; that of the abdomen dust-coloured." According to my recollection, however, of Dr. Cantor's specimen, it was as dark as the female now before me; for I especially remember suspecting its identity with the common minute species of all India, Sc. COROMANDELIANUS, (F. Cuv.), which I have likewise seen from Singapore.

Of reptiles, are included an apparently new Scinque (PLESTIODON QUADRILINEATUM, nobis),—a small HEMIDACTYLUS,—CORONELLA RUSSELLII, COLUBER RADIATUS; DIPSAS MULTIMACULATA, TROPIDONOTUS UMBRATUS, and HYDRUS STRIATUS, with also a few INSECTA and other sundries which do not need to be here enumerated.

E. BLYTH.

LIBRARY.

Additions to the Library during the past month have been the following:—

Presented.

Observations made at the Magnetical and Meteorological Observatory at Hobart Town in Van Diemen's Land. Printed under the superintendence of Col. E. Sabine, vol. III. London, 1853.—BY THE BRITISH GOVERNMENT.

Jury-Institutionen i Storbritanien, Canada og de forenede Stater af

Amerika. Vol. II. Christiania, 1851.—By the Royal University of Christiania.

Uber Micha den Morastheten und Seine prophetische Schrift von Dr. C. P. Caspari. 2nd part. Christiania, 1852, 8vo.—By the same.

Nyt Magazin for Naturvidenskabernc. Vol. 7. p. 1.—By the same.

Fortegnelse over Jordegods og andre Herligheder tilhörende erkebiskopsstolen i nidaros affattet ved erkebiskop aslak bolts Foranstaltning mellem aarene 1832 og 1849. P. A. Munch. Christiania, 1852.—By the same.

Det norske Sprogs væsentligste Ordforraad, sammenlignet med Sanskrit og andre Sprog af samme Æt. Bidrag til en norsk etymologisk Ordbog, af C. A. Holmboe. Wien, 1852, 4to.—By the Author.

Memoires de l'Academie des Sciences, Arts et Belles Lettres de Dijon, Année, 1850.—By the Academy.

Selections from the Public Correspondence of the Board of Administration for the affairs of the Punjab. No. 4, 4 copies.—By the Board.

Selections from the Records of the Bengal Government, No. XII. Embankments of the Damooda. 2 copies.—By the Bengal Government.

Journal Asiatique, No. 3.—By the Socie'te' Asiatique.

Bibidhártha Sangraha, No. 21.—By the Editor.

Satyárnab, Vol. III.—By the Rev. J. Long.

Vedánta Darsana, Nos. 7, 8.—By the Editor.

Ditto ditto.—By Ba'bu Jadavakrishna Sinha.

Annual Report of the Tattwabodhiná Sabhá for 1774 Saka.—By the Sabha'.

Tattwabodhiní Patriká, No. 120.—By the same.

The Upadesaka, No. 81.—By the Editor.

The Missionary, Nos. 8, 9.—By the Editor.

The Oriental Baptist, No. 81.—By the Editor.

The Oriental Christian Spectator for July, 1853.—By the Editor.

The Calcutta Christian Observer for Sept. 1853.—By the Editor.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, for the months of Jan. and Feb., 1853.—By Ba'bu Ra'dha'na'th Sikda'r.

The Citizen for August and Sept. 1853.—By the Editor.

The Purnachandrodaya for Ditto.—By the Editor.

Exchanged.

The London, Edinburgh and Dublin Philosophical Magazine, Nos. 34, 5, 6.

Jameson's Journal, No. 102.

Purchased.

Comptes Rendus, Nos. 19 to 26.
Journal des Savants for May and June, 1853.
The Annals and Magazine of Natural History for June and July, 1853.
Maurice on the Religions of the World.
Christomathie aus Sanskritwerken.—Von T. Benfey.
Vollstandige Grammatik der Sanskritsprache.—Von T. Benfey.
Williams's English Sanskrita Dictionary.

Ra'jendrala'l Mittra.

For October, 1853.

The Society met on the 5th instant, at the usual hour.

J. R. Colvin, Esq., V. P., in the Chair.

The proceedings of the last month were read and confirmed, and the accounts and vouchers for the month of July laid on the table.

Presentations were received—

1st. From J. Ackermann, Esq., Secretary of the Society of Antiquaries, London, the latest publications of the Society (vide Library Report).

2nd. From the Government of India, through T. Oldham, Esq., Superintendent of Geological Survey, specimens of rocks and earths from the gold bearing districts in the vicinity of Mount Ophir, Malacca, collected by T. Braddell, Esq., Assistant Resident.

3rd. From the Bombay Government through Lieut. E. F. Fergusson, I. N., Superintendent of the Government Observatory, Magnetical and Meteorological Observations made at the Bombay Observatory during 1850.

4th. From the Bengal Government through W. Gordon Young, Esq. Under-Secretary, a Map of the district of Purneah surveyed by Messrs. FitzPatrick and J. J. Pemberton.

5th. From Captain Young, Rangoon, a large slab of marble, bearing a figure of the impression of the foot of Guadama.

6th. From the British Government through Her Majesty's

Minister for Foreign Affairs, two copies of a sketch of the Bornu or Kanuri language, with dialogues, translations and vocabulary drawn up by Mr. Norris, translator of foreign languages in the Foreign Office, from papers sent to England by the late Mr. James Richardson while employed in the interior of Africa.

Mr. Addington's letter points out "that the grammatical sketch is confined to the Bornu language, and the lithographic fac-similes contain materials for a work in the Hansa or Soudanese language also; of which language, however, there is already a Grammar in print by the Rev. Mr. Schön."

7th. From Major Saunders Alexius Abbott through Major J. Abbott, three silver Greek coins.

The following is an extract from Major J. Abbott's letter.

"I have the pleasure to send, in this packet from my brother Major Saunders Alexius Abbott, Deputy Commissioner of Hoshiarpoor, a silver coin which I do not remember to have seen described. It is a hemidrachm of the Arianian king Dionusos, and seems entitled to hold place immediately after the coinage of Apollodotos and immediately before that of Zoilos. As, however, I am travelling and have no means of reference to the list of coins, my memory may deceive me as to its rarity.

"Like the circular hemidrachms of Apollodotos the execution is very rude and far inferior to that of the copper coinage of the latter king.

The type is as follows:

Head of the King facing the East.

ΒΑΣΙΛΕΩΣΣΩΤΗΡΟΣΔΙΟΝΥΣΙΟΥ.

R. Pallas with the Ægis thundering.

"Four coins of this type, with about thirty other silver coins of the same figures and size, were found together by a little boy, as he dug in the bank of a village near Anundpoor, Makowal, on the left bank of the Sutlej above Roopur. Of these coins one was of Lusias, several were of Zoilos, and the rest were of Apollodotos. All so much resembled one another (that of Lusias excepted) as to be easily mistaken for coins of a single type.

"The use of the title Soter and the appearance of Pallas thundering, seem to ally these coins with the coinage of Menander, Apol-

lodotos and Zoilos, while the occurrence of the coins together, seems to give additional probability to the alliance.

" I have the pleasure to add in my brother's name a coin of Zoilos found with the above and another of Apollodotos. The latter, differing somewhat in type from those in my collection, may possibly be acceptable to the Society."

8th. From Major Turton, specimen of a fossil root from Prome (vide Proceedings for July last.)

9th. From Major Baker, on the part of Major H. Fraser, specimens of fossil shells from the banks of the Irrawaddy at Prome.

10th. From Dr. Fayrer, Rangoon, a Burmese water jar of curious construction.

11th. From Captain Layard, a twelve-armed figure found in a tank at Ghysabad (vide Proceedings for the last month.)

12th. From E. C. Craster, Esq., C. S., a gold coin of Toghlak Shah found in the ruins of Gour.

Read a note from G. R. French, Esq. requesting to withdraw his name from the list of members.

Communications were received :—

1st. From Walter Elliot, Esq. Vizagapatam, enclosing a list of Tamil and Canarese works, published at the press of the London Missionary Society, Ballery.

2nd. From Bábu Rádhánáth Sikdár, Superintendent of the Observatory, through Captain Thuillier, enclosing Meteorological Registers kept at the Surveyor General's Office, Calcutta, for the months of March, April, May, June, July and August, 1853.

3rd. From W. Muir, Esq. enclosing copy of Meteorological Register kept at the Government Secretariat Office, Agra, for the month of May, 1853.

4th. From Major J. Abbott, Deputy Commissioner in the Hazara, communicating note of an investigation which he has recently made of the ruins at Maunkyala.

Resolved that the paper be published in the Journal.

5th. From G. Couper, Esq., Officiating Secretary to the Government of India, enclosing correspondence, received from the Bombay Government, on the subject of chintz printing at Tatta in Scinde.

6th. From Norton Shaw, Esq., Secretary, Geographical Society, London, acknowledging receipt of Journal No. 39.

7th. From John Barlow, Esq., Secretary Royal Institution, London, acknowledging receipt of the Catalogue of Birds.

8th. From H. Piddington, Esq., Curator, Museum of Economic Geology, submitting a note on Nepalite, believed to be a new mineral from the neighbourhood of Kathmandoo.

The Curators and the Librarian submitted reports of additions made to their respective departments during the past month.

Thanks having been voted for the above donations and communications, the meeting adjourned.

Read and confirmed,

(Signed) J. W. Colvile.

Nov. 2nd, 1853.

Report of Zoological Curator for September Meeting.

At the last meeting of the Society, it was mentioned by the President that Dr. A. Campbell of Darjiling had forwarded some skins for our museum, of mammalia from Tibet. These have since come to hand, and two of them seem to pertain to species hitherto undescribed.

One is an imperfect skin of a Bear, termed by Dr. Campbell the "Blue Bear of Tibet. The people assure me," he writes, "that it is not an accidental colour, but that it is a well known species, distinct from TIBETANUS, and from the white one or Arctic species" (qu. ISABELLINUS, mentioned subsequently by Dr. Campbell). "I am trying to get a skull, and a perfect skin for the Society." This Bear has a fine coat, of longer and softer fur than in cis-Himalayan TIBETANUS, but not so long nor shaggy as in fine specimens of ISABELLINUS: the colour black, with hoary or light brown tips which impart a very characteristic appearance; hence PRUINOSUS would be an appropriate name, if it prove to be a distinct species. The hoary tips to the fur disappear upon the limbs, which are wholly black (so much of them at least as are shewn in the specimen); and there is the same narrow white V-like mark on the breast as in the Himalayan Bear known as U. TIBETANUS,—of which my impression is that this Tibetan animal will prove to be a trans-nivean variety, and that the name TIBETANUS, therefore, is more correctly applicable to the species than has been supposed.

Two Badger skins are sent, evidently of distinct species and even genera. One is the TAXIDEA LEUCURUS described and figured by Mr. Hodgson in *J. A. S.* XVI, 763. The other is a true MELES affined to the European Badger, but which I adjudge to be distinct because it has a

white throat, whereas the European Badger (of which we possess two mounted specimens for comparison) has constantly a black throat. From the TAXIDEA of Tibet it differs altogether, as much as the European Badger differs from the N. American TAXIDEA: it has smaller and much less tufted ears, a shorter and much less brushy tail, and the fur shorter and coarser, though of finer texture than in the European Badger, with much woolly hair at its base. General colour as in MELES TAXUS, but the throat white as aforesaid, and the markings of the face are different. In M. TAXUS the head is white, and a broad and well defined blackish-brown band commences midway to the eye and muzzle, is continued through the eye and ear, and gradually disappears upon the shoulder; the bands of the two sides leaving a broad and well defined white interspace, which contracts and is gradually lost posterior to the ears. In the Tibetan Badger (M. ALBOGULARIS, nobis), the white interspace referred to contracts immediately behind the eyes, and continues as a narrow and ill defined band so far as between the ears only; the lateral dark bands proportionally expanding behind the eyes, and all merging in the grizzled hue of the back from the occiput, and not from the shoulder backward as in M. TAXUS. In the European Badger the cheeks are broadly white, bordered above by the dark band through the eye, and below by the black throat. In the Tibetan Badger there is little white below the eye, and this ill-defined; and it is bordered below by a narrow dark band, beyond which is the white throat. I do not doubt that these distinctions will prove permanent, as the European Badger is not subject to vary in its peculiar markings (though some affined animals, as the American Skunks and African Zorilles, certainly do, to a greater or less extent in different species). The Tibetan Badger is probably also a smaller animal than that of Europe.*

While examining our series of the Badger group, my attention was attracted to another undescribed species, which I have recognised as dis-

* *N. B.* It would seem that Mr. Hodgson has figured the exterior of the Tibetan TAXIDEA, and the skull of the Tibetan MELES as that of the TAXIDEA; little suspecting the existence of a true MELES also in Tibet. In this case, the Tibetan true Badger would be fully as large as that of Europe. It is also probable that the identical specimens were forwarded to the Hon'ble Company's museum by Mr. Hodgson, being those noticed by Mr. Gray in *Ann. Mag. N. H.* Sept. 1853, p. 221. There can, assuredly, not be the least doubt of the specifical, if not generic, distinctness of the two Tibetan specimens now sent by Dr. Campbell, although the skulls of both are unfortunately wanting.

tinct for many years, but awaited further information concerning its distribution, &c., before bringing it to notice in the Society's Journal. This is a second species of *Bhaloo-soor* or Hog-badger, which may be designated—

Arctonyx taxoides, nobis, *n. s.* Adult about half the size of the adult of A. collaris, F. Cuv. : having a much longer and finer coat, very like that of the European Badger but softer, though not so long and soft as in Taxidea ; the muzzle less broad and Hog-like than in A. collaris ; the ears also are proportionally smaller than in that species ; the tail is shorter ; and the colours and markings, though similar, are much brighter. Greatest length of skull of a fully adult (but not aged) male of A. collaris, $6\frac{3}{8}$ in. ; greatest breadth of zygomata, posteriorly, $3\frac{1}{16}$ in. ; length of bony palate 4 in. ; width at posterior great molar $1\frac{1}{8}$ in. In an aged female A. collaris, the same admeasurements are $6\frac{1}{8}$, $3\frac{5}{8}$, $3\frac{7}{8}$, and $1\frac{1}{16}$ in. In a fully adult female of A. taxoides, $4\frac{3}{4}$, $2\frac{3}{8}$, $2\frac{3}{4}$ and $\frac{13}{16}$ in. Dentition of the upper jaw similar in the two species : in the lower jaw, the interspace between the second and third præmolars is proportionally much greater in A. collaris than in A. taxoides. Lastly, the large species attains with age a strongly marked sagittal crest, which I doubt is ever seen in the other. Our two specimens of A. taxoides are respectively from Asám and Arakan ; so that both species inhabit the same range of territory, and are probably commonest in Sylhet.

Two other skins sent by Dr. Campbell are those of the Tibetan Lynx (F. isabellina, nobis, *J. A. S.* XVI, 1178), and of the Felis macrocelis (v. *macroceloides*, Hodgson). Of the latter, we previously possessed two mounted specimens, both sent from Darjiling ; and a skin from the Ya-ma-dong mountains which separate Arakan from Pegu. I also lately saw two living specimens from Upper Asám ; and have been assured, on good authority, that the species is not uncommon in the north of China. Mr. Hodgson states it to inhabit Tibet ; and it was originally discovered by Raffles in the mountains of Sumatra. At least, no satisfactory distinction has been pointed out between macrocelis of Sumatra and macroceloides of Tibet ; and as the latter is positively the same from Upper Asám and the mountains of *Arakan*, there would be nought remarkable in its range extending along the mountainous spine of the Malayan peninsula and that also of Sumatra. A nearly allied but much smaller species, common in the Malayan Peninsula, is F. marmorata ; and this also we have from Upper Asám ! (*J. A. S.* XVII, 83.) Both are about the most eminently arboreal of the Cat tribe, judging from the Asámese specimens which I saw alive, and which were most graceful and accomplished climbers, with much of the action,

probably, of the diminutive PRIONODON. The large F. UNCIA has also nearly the same proportions, with similar very long and well furred tail; and it may prove to be equally arboreal in the mountain pine-forests. The proper ground Cats for little wooded districts are the Lynxes, which are the extreme opposites in structure to the true Leopard group, wherein the three preceding species are comprised. Yet even the Lynxes are not bad climbers; whereas there are some few Cats, as the three largest of all, the Lion, Tiger, and Jaguar, which never ascend trees, as the Leopard does so very commonly. That the Cheeta (F. JUBATA) is no climber, is much less to be wondered at.

Together with the male specimen of the *Shou*, or Tibetan Stag, presented on a former occasion by Dr. Campbell,—the horns of which are far from having attained a first-rate magnitude, as shewn by Mr. Hodgson's figure and description in *J. A. S.* X, 722, as well as by his subsequent description, *ibid.* XX, 388,—I have now the pleasure of exhibiting for comparison a noble frontlet and horns of the *Wapiti* Stag of N. America, C. CANADENSIS. To any person who has made a study of the subject, and is conversant with the essential distinctions observable among the horns of different species of Deer, over and above the variations to which all are liable, those specifical distinctions are exceedingly well marked in the horns of the *Shou* and of the *Wapiti*. As long ago stated by me of a fine Stag-horn from Kashmir, the species being (as I now feel more than ever confident) the same as that of Tibet, of Persia (where known as the *Maral*), and in all probability that of the southern parts of Siberia and of the north of China,—" the general character of horn [of the great Asiatic Stag] is intermediate to that of the *Wapiti* and European Stag, but agreeing more nearly with the latter in its kind of granulated surface."* With the horns of all three species now before me, aided by familiar recollection of numerous horns of C. ELAPHUS, the typical character of the latter, or European Stag, is to have the most roughly granulated surface to the horn, decidedly; in the Asian Stag, the rugosity is well marked, but smoothened a good deal, so as to be much less harsh to the feel; and in the N. American Stag there is scarcely any roughness whatever, the horn being smoother than in the Fallow Deer. Hence I suspect that, in the great majority of instances, these horns might be readily enough distinguished by the *feel* alone. Next, the tendency to flatten, or palmate, in the crown of the *Wapiti* horn is very decided, from the base of the median on " royal antler" upward or onward. The utmost transverse depth of this palmature, at the base of the main fork of the crown, in the

* *Proc. Zool. Soc.* 1840, p. 80.

pair of *Wapiti* horns now exhibited, amounts to 7 in., by 1½ in. breadth. Nothing of the kind is ever seen in the European Stag, nor (it would seem) in the Asian species. Again, the tendency in the *Wapiti* is to have the crown not only flattened, but further subdivided than in the Asian *Shou*, in which, we may now venture to affirm, it rarely more than simply bifurcates; but Capt. Cunningham assured Mr. Hodgson that "the Kashmir Stag has, sometimes, a double fork at the top of its horns."* Such is shewn in the *Wapiti* horns now before the meeting; the crown first bifurcating, with a considerable amount of palmation as already described, this flattening being continued on each branch, and the hinder of these again bifurcating, while the anterior bifurcates imperfectly on the left horn, and tends towards the same form on the right horn; the posterior prong of the anterior main branch of each crown being the defective one. Next (and this I remember well to be characteristic of the *Wapiti*), the posterior main branch of the crown does not slant somewhat abruptly inwards, like the usually undivided posterior prong of the (in general) simply bifurcating crown of the Asian *Shou*, but inclines directly backward and somewhat downward, with a tendency to subdivide again and again, as shewn in the otherwise abnormal *Wapiti* horn (No. 4) figured in *J. A. S.* X, plate 4, p. 750. Another marked and distinctive character of an average *Shou* horn is the comparatively very abrupt bend of the beam from the base of the median or royal antler, which, with the equally abrupt slant inward of the posterior prong of the bifurcating crown, imparts a sort of lyrate aspect to the pair, very different from the more even curvature of beam seen in the *Wapiti*. Lastly, still another character very commonly present in *Wapiti* horns, and scarcely if ever seen in those of the *Shou* and European Stag, consists in the presence of a small snag between the bases of the brow and bez antlers, and a little to the front; which is distinctly shewn, though small, in both horns of the pair before us.

2. To Babu Rajendra Mallika, we are indebted for a fine stuffed specimen of a young Cassowary, retaining much of the brown plumage of youth, though at the time of its death it was putting forth the black plumage of maturity; and the two are throughout intermixed in the specimen. Also a dead Rose-breasted Cockatoo (CACATUA EOS); and a broken egg of CYGNUS ATRATUS.

3. From Dr. Fayrer, late of Rangoon. A few specimens in spirit, comprising ELAPS MELANURUS, HOMOLOPSIS HYDRINA, Cantor, BUNGARUS CANDIDUS, SCORPIO AFER, and a few other sundries.

* *J. A. S.* XX, 393.

4. Capt. S. R. Tickell, now of Maulmain. A skin of the great Fire-back Pheasant, or Macartney cock (Euplocomus ignitus), and one of Ardetta sinensis.

E. Blyth.

Library.

The following additions have been made to the library since the last meeting.

Presented.

Report of the British Association for the Advancement of Science for 1852.—By the Association.

Catalogue of Stars near the Ecliptic observed at Markree, during the years 1851-52, and whose places are supposed to be hitherto unpublished, Vol. II. containing 15,298 stars. Dublin, 1853.—By the British Government.

Nuovo Dizionario Italiano-Francesco,-Armeno-Turco, compilato sui Migliori Vocabolarii di queste Quattro lingue dai Padri della congregazione Mechitaristica. Vienna, 1846, Royal 8vo.—By J. Avdall, Esq.

Zeitschrift der Deutschen morgenländischen Gesellschaft, VII. Band, 3 heft.—By the Society.

Indische Studien, II. Band, 3 heft.—By the Same.

Journal Asiatique, June, 1853.—By the Socie'te' Asiatique.

Address at the Anniversary meeting of the Royal Geographical Society, by Sir R. Murchison.—By the Society.

Quarterly Journal of the Geological Society, Nos. 34, 35.—By the Society.

Address delivered at the Anniversary meeting of the Geological Society of London on the 18th of February, 1853, by W. Hopkins, Esq.—By the Same.

Calcutta Christian Observer for November, 1853.—By the Editors.

Journal of the Indian Archipelago for February and March, 2 copies.—By the Government of Bengal.

Oriental Christian Spectator for September.—By the Editor.

The Upadeshak, No. 83.—By the Editor.

The Oriental Baptist, No. 83.—By the Editor.

The Missionary for October, 1853.—By the Editor.

Tuttwabodhiní Patriká, No. 123.—By the Tuttwabodhini' Sobha'.

Bibidhártha Sangraha, No. 21.—By the Editor.

Purnachundrodaya for October.—By the Editor.

The Citizen for October, 1853.—By the Publisher.

Exchanged.

The Philosophical Magazine, No. 37.
The Calcutta Review, No. 41.

Purchased.

The Annals and Magazine of Natural History for August.
Comptes Rendus, Nos. 1 to 4 for July, 1853.
Edinburgh Review, No. 199.

RA'JENDRALA'L MITTRA.

Abstract of Meteorological Observations for the month of April, 1853.

Rangoon, 1*st May*, 1853.

Thermometer Sunrise.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer Sunset.			Thermometer 9 P. M.			Remarks.
Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	
Wet.... 77	74	75.764	82	75	78.584	81	77	79.35	85	75	80.717	One observation.			80	74	78	On the 18th a violent squall of wind and rain .90 inch fell. Several houses crushed by the storm. Weather during the month fine, but cloudy, wind prevailing S. W. in afternoon N. E. and N. W. in mornings: Frequently fresh breezes.
Dry.... 79	75	77	93	81	84.612	100	92	95.947	100	94	96	85	81	82.8	85	81	82.8	

Barometer Sunrise.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer Sunset.			Barometer 9 P. M.		
No instrument.																	
Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.	Maximum.	Minimum.	Min. of preceding observations.

J. Fayrer, M. D. *Asst. Surgeon,*
Field Hospital, Rangoon.

Date.	Sunrise.						9 A. M.						Noon.					
	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Rain.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.		Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	
	Wet.	Dry.					Wet.	Dry.					Wet.	Dry.				
1	74	75	..	....	....	..	78	84	..	....	....		78	92	..	S. W. fog.	Cumuli.	
2	75	76	..	Calm.	Cumuli.	..	..	..	..	N. W. lt.	Cumuli.		78	93	..	Ditto.	Ditto.	
3	75	77	..	Ditto.	Ditto.	..	77	80	..	Ditto.	Cirri.		79	96	..	W. fog.	Ditto.	
4	75	76	..	N. W. lt.	Hazy.	..	75	83	..	Ditto.	Clear.		80	92	..	S. W. do.	Ditto.	
5	75	76	..	Ditto.	Calm.	..	..	..	..	....	....		..	..	..	....	....	
6	76	77	..	Ditto.	Clear.	..	79	87	..	W. lt.	Cirri.		79	95.5	..	W. lt.	Cumuli.	
7	..	..	..	Ditto.	Cloudy.	..	82	85	..	Ditto.	Cumuli.		..	..	..	....	....	
8	..	..	..	Ditto.	Hazy.	..	..	..	..	....	....		81	95	..	W. lt.	Cumuli.	
9	..	..	..	Ditto.	Ditto.	..	79	84	..	W. lt.	Cirri.		79	97	..	Ditto.	Ditto.	
10	76	78	..	Ditto.	Ditto.	..	..	..	..	Ditto.	Ditto.		81	100	..	Ditto.	Ditto.	
11	76	78	..	Ditto.	Ditto.	..	79	83	..	Ditto.	Ditto.		81	100	..	S. W. lt.	....	
12	77	79	..	Ditto.	Ditto.	..	..	..	..	....	....		..	..	..	....	....	
13	76	77	..	Ditto.	Ditto.	..	78	81	..	N. W. lt.	Cumuli.		..	..	..	....	....	
14	76	77	..	N. E. lt.	Clear.	..	79	80	..	Ditto.	Ditto.							
15	..	..	..	....	....	..	..	..	..	....	....		..	..	..	....	....	
16	..	..	..	....	....	..	81	86	..	N. W. lt.	Cumuli.		..	..	..	....	....	
17	..	..	..	....	....	..	79	85	..	Ditto.	Ditto.		78	98	..	S. W. fog.	Cirri.	
18	76	79	..	....	....	..	79	84	..	Ditto.	Ditto.		79	95	..	S. W. lt.	Ditto.	
19	76	78	..	N. E. lt.	Clear.	.90	..	..	..	....	....		82.5	94	..	Ditto.	Clear.	
20																		
21	76	77	..	N. E. lt.	Clear.	..	79	93	..	N. W. lt.	Cumuli.							
22	76.5	76	..	....	....	..	76	86	..	Ditto.	Cirri.							
23	..	..	..	....	....	..	82	84	..	Ditto.	Ditto.		..	96	..	S. W. lt.	Cumuli.	
24	75	75	..	N. E. lt.	Cirri.	..	77	85	..	Ditto.	Ditto.		79	88.5	..	Ditto.	Clear.	
25	75	77	..	Ditto.	Ditto.	..	..	..	..	....	....		80	97.5	..	Ditto.	Ditto.	
26	..	..	..	....	Ditto.	..	..	..	..	....	....		81	98	..	Ditto.	Ditto.	
27	..	..	..	....	Ditto.	..	..	..	..	....	....		..	..	..	....	....	
28	..	..	..	....	Ditto.	..	..	..	..	....	....		78	99	..	S. W. lt.	Cumuli.	
29	74	76	..	N. E. lt.	Ditto.	..	77	85	..	S. W. lt.	Cumuli.		77	97.5	..	S. W. fog.	Ditto.	
30	76	78	..	N. W. fog.	Clear.	..	78.5	88	W. fog.	Cumuli.	Hazy.		78	99	..	Ditto.	Ditto.	
Total.	1439.5	1463.2	..	....	....	..	1414.5	1523	..	....	....		1428.5	1823.0	..	....	....	
Mean.	75.764	77	..	....	....	..	78.584	84.612	..	....	....		7935	95.947	..	....	....	

Meteorological Remarks for the month of April, 1853—(Continued.)

3 P. M.					Sunset.					9 P. M.					Remarks.
Thermometer		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Aneroid Barometer.	Force and direction of Wind.	Aspect of Sky.	
Wet.	Dry.				Wet.	Dry.				Wet.	Dry.				
78	95	..	S. W. fog.	Cumuli.	..	..	..	Thunder.	Stm. rain.	74	81	S.W. f.	Cumuli.	Cirri.	
80	94	..	Ditto.	Ditto.	..	..	..	S. W. fog.	Cumuli.	..	..	..	..	Cumuli.	Pleasant cool air.
..	..	..	....	..	79	85	..	..	..	77	81	..	Cumuli.	Ditto.	
83	95	..	S. W. fog.	Cumuli.	..	..	..	..	..	78	81	Calm.	..	Ditto.	Thunder, shower.
80	96	..	S. W. lt.	Ditto.	..	..	..	..	..	80	83	..	Cumuli.	Clear.	
83	97	..	Ditto.	Ditto.	..	..	..	..	..	..	..	..	..	..	Fresh breeze.
..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	Ditto.
83	94	..	S. W. fog.	Cumuli.	..	..	..	..	..	..	..	..	..	..	Ditto.
83	97	..	Ditto.	Cirri.	..	..	..	..	..	..	..	..	..	..	Ditto.
..	..	..	....	..	..	..	..	..	..	80	84	..	S. W. lt.	Clear.	
84	97	..	W. fog.	Clear.	..	..	..	..	..	80	85	..	Ditto.	Ditto.	
80	100	..	S. W. lt.	Ditto.											
85	98	..	Ditto.	Ditto.											
81	95	..	S. W. lt.	Clear.											
79	100	..	Ditto.	Ditto.	..	..	..	..	..	80	85	..	S. W. lt.	Clear.	
83	93	..	Ditto.	Ditto.											
85	92	..	S. W. fog.	Fr. brz.	..	..	..	..	..	79	83	..	S. W. lt.	Cirri.	Lightning in S. E.
78	86	..	S. W. lt.	Cumuli.											A violent storm of wind, thunder and rain, squall shifting from N. E. to the N. West and doing much damage to the houses inside stockade. Near the river but little felt .90 of an inch rain fell in the afternoon of the 18th at 3 P. M. to 5.
81	99														
75															
82	96	..	S. W. fog.	Cloudy.											
82	97	..	Ditto.	Ditto.											
82	99	..	S. W. lt.	Cumuli.											
81	95	..	Ditto.	Ditto.	..	..	..	..	..	77	83	..	S. W. lt.	Clear.	
78	100	..	Ditto.	Ditto.	..	..	..	..	..	75	82	..	Ditto.	Ditto.	
78.5	100	..	S. W. fr.	Ditto.											
1855.5	2112	..	....	..	..	..	..	..	..	780	828				
80.717	96.	..	....	..	..	..	..	..	..	78.	82.8				

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1853.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer.			Mean Dry Bulb Thermometer.	Range of the Temperature.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.960	30.052	29.875	0.177	66.4	78.6	51.9	26.7
2	.915	29.991	.843	.148	67.4	80.0	51.7	28.3
3	.961	30.046	.908	.138	69.2	80.6	56.0	24.6
4	.936	.028	.866	.162	70.9	81.5	53.5	28.0
5	.905	29.988	.858	.130	72.8	83.2	57.4	25.8
6	*Sunday.*							
7	.944	30.020	.902	.118	70.6	79.2	62.8	16.4
8	.957	.036	.901	.135	69.4	79.4	58.4	21.0
9	.952	.031	.897	.134	69.5	80.8	56.0	24.8
10	.950	.028	.889	.139	70.3	80.8	57.4	23.4
11	.937	.009	.885	.124	71.8	83.2	57.5	25.7
12	.886	29.974	.808	.166	73.1	83.0	60.5	22.5
13	*Sunday.*							
14	.857	.943	.794	.149	74.8	87.0	60.3	26.7
15	.837	.922	.766	.156	74.6	87.4	60.6	26.8
16	.798	.873	.727	.146	76.1	89.2	62.0	27.2
17	.840	.917	.784	.133	77.1	89.4	61.0	28.4
18	.905	.978	.857	.121	79.6	90.6	67.4	23.2
19	.888	.978	.805	.173	80.6	92.7	66.9	25.8
20	*Sunday.*							
21	.871	.969	.804	.165	77.4	90.7	65.8	24.9
22	.845	.938	.777	.161	78.2	91.0	66.8	24.2
23	.874	.967	.818	.149	78.3	90.8	64.3	26.5
24	.909	.990	.853	.137	76.8	90.0	63.0	27.0
25	.979	30.056	.926	.130	77.4	90.2	64.9	25.3
26	.998	.100	.929	.171	77.7	90.3	62.4	27.9
27	*Sunday.*							
28	.943	.016	.886	.130	81.1	93.5	67.6	25.9

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1853.—*(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	60.6	5.8	56.7	9.7	0.468	5.18	1.99	0.722
2	61.1	6.3	56.9	10.5	0.472	5.20	2.19	.704
3	61.8	7.4	56.9	12.3	0.471	5.19	2.62	.665
4	64.3	6.6	60.3	10.6	0.528	5.80	2.43	.705
5	67.5	5.3	64.7	8.1	0.610	6.69	2.02	.768
6	*Sunday.*							
7	66.0	4.6	63.4	7.2	0.586	6.44	1.71	.790
8	62.9	6.5	58.8	10.6	0.502	5.53	2.33	.704
9	62.2	7.3	57.4	12.1	0.480	5.28	2.60	.670
10	63.4	6.9	59.1	11.2	0.508	5.58	2.50	.691
11	65.6	6.2	62.1	9.7	0.560	6.14	2.31	.727
12	65.6	7.5	61.3	11.8	0.545	5.97	2.82	.679
13	*Sunday.*							
14	65.6	9.2	60.2	14.6	0.526	5.73	3.53	.619
15	64.8	9.8	58.8	15.8	0.502	5.47	3.73	.595
16	65.7	10.4	59.5	16.6	0.515	5.58	4.05	.579
17	68.0	9.1	63.0	14.1	0.578	6.27	3.65	.632
18	72.6	7.0	69.3	10.3	0.711	7.67	3.02	.717
19	71.1	9.5	66.4	14.2	0.645	6.97	4.04	.633
20	*Sunday.*							
21	64.7	12.7	56.6	20.8	0.467	5.06	4.95	.505
22	65.8	12.4	58.3	19.9	0.494	5.34	4.91	.521
23	67.6	10.7	61.6	16.7	0.551	5.96	4.32	.580
24	64.9	11.9	57.4	19.4	0.480	5.20	4.63	.529
25	64.5	12.9	56.2	21.2	0.460	4.99	5.02	.499
26	65.0	12.7	57.0	20.7	0.473	5.12	4.98	.507
27	*Sunday.*							
28	69.5	11.6	63.3	17.8	0.584	6.28	4.89	.562

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1853—(Continued.)

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
1	95.3	..	S. W. or S. E.	Nearly cloudless.
2	95.9	..	S. or S. W.	Cloudless.
3	97.7	..	S. W. or W. or Calm.	Cloudless till 6 A. M. scattered \ i till 5 P. M. cloudless afterwards. [wards.
4	92.2	..	Calm or S. or W.	Scattered \ i till 6 P. M. cloudless after-
5	95.2	..	Calm or S.	Cloudless till 8 A. M. scattered \ i or _ i till 7 P. M. cloudless afterwards.
6	*Sunday.*			
7	93.5	..	S. or N. W.	Cloudless till 10 A. M. scattered ∩ i till 4 P. M. cloudless afterwards.
8	93.7	..	N. or N. W.	Cloudless.
9	94.9	..	N. W. high from 1 till 3 P. M.	Cloudless till 11 A. M. scattered \ i till 7. P M. cloudless afterwards.
10	96.3	..	Calm or N. W. high at noon and 1 P. M.	Cloudless. [7 P. M. cloudless afterwards.
11	..	..	Calm or N. W.	Cloudless till 8 A. M. scattered \ i till
12	..	..	N. W. or W. or S. W.	Cloudless till 6 A. M. scattered \ i till 7 P. M. cloudless afterwards.
13	*Sunday.*			
14	..	..	W.	Nearly cloudless the whole day.
15	..	..	S. W. or W. or N. W.	Cloudless.
16	..	..	W. or S. W. high at 1 and 2 P. M.	Cloudless.
17	..	..	S. or W. or S. E.	Cloudless.
18	..	..	S. or W.	Cloudless till 3 A. M. overcast till 5 A. M. scattered _ i or ∩ i till 9 A. M. cloudless afterwards. [wards.
19	..	..	S. or S. W.	Cloudless till 4 P. M. scattered ∩ i after-
20	*Sunday*			
21	..	..	S. W. or N. W.	Nearly cloudless, occasionally scattered \ [i or _ i. [less afterwards.
22	..	..	Calm or N. W. or S. W.	Scattered \ i till 7 A. M. nearly cloud-
23	..	..	S. W. or N. W. or W.	Cloudless.
24	..	..	W. or N. W.	Cloudless.
25	..	..	S. or N. or N. W.	Cloudless. [or _ i.
26	..	..	W. or N. W.	Nearly cloudless, occasionally scattered \ i
27	*Sunday.*			
28	..	..	S. or N. W.	Cloudless barring little \ i at 9 A. M. and noon.

\ i ..... Cirri.
∩ i ..... Cumuli.
— i ..... Strati.
\ i ..... Cirro-cumuli.
_ i ..... Cirro-strati.
∩ i ..... Cumulo-strati.
\ _ i ..... Nímbí.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1853.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Date.	Mean Height of the Barometer at 32° Faht.	Range of the Barometer.			Mean Dry Bulb Thermometer.	Range of the Temperature.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.949	30.031	29.893	0.138	82.1	93.2	67.0	26.2
2	.943	.045	.861	0.184	78.5	89.5	67.5	22.0
3	.913	.066	.829	0.177	76.9	90.0	62.4	27.6
4	.880	29.962	.807	0.155	77.6	90.7	64.5	26 2
5	.877	.974	.786	0.188	77.9	90.4	64.4	26.0
6	*Sunday.*							
7	.886	.952	.843	0.109	83.3	95.4	64.3	31.1
8	.878	.954	.830	0.124	83.0	95.0	69.9	25.1
9	.893	.965	.837	0.128	82.4	94.8	68.5	26.3
10	.885	.972	.821	0.151	83.5	95.5	70.0	25.5
11	.899	.987	.831	0.156	80.1	92.0	67.5	24.5
12	.858	.949	.778	0.171	79.8	93.6	64.8	28.8
13	*Sunday.*							
14	.801	.858	.739	0.119	85.2	96.2	75.3	20.9
15	.843	.916	.788	0.128	83.6	96.6	71.5	25.1
16	.886	.974	.828	0.146	82.3	93.3	70.5	22.8
17	.871	.954	.809	0.145	82.9	95.6	69.0	26.6
18	.883	.966	.819	0.147	84.2	97.0	68.7	28.3
19	.892	.982	.814	0.168	84.8	97.3	69.3	28.0
20	*Sunday.*							
21	.842	.926	.770	0.156	84.2	95.5	73.0	22.5
22	.831	.910	.775	0.135	84.4	95.7	74.0	21.7
23	.829	.916	.736	0.180	85.7	99.3	74.3	25.0
24	.777	.849	.696	0.153	86.3	98.6	74.3	24.3
25	*Good Friday.*							
26	762	.847	.702	0.145	85.9	99.0	73.6	25.4
27	*Sunday.*							
28	.773	.847	.721	0.126	84.4	92.7	74.5	18.2
29	.761	.830	.695	0.135	85.7	95.7	75.4	20.3
30	.747	.806	.690	0.116	85.9	95.5	75.4	20.1
31	.757	.829	.698	0.131	85.7	96.0	76.5	19.5

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1853.—*Continued.*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional Weight of vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	69.9	12.2	63.5	18.6	0.587	6.30	5.21	0.547
2	63.4	15.1	53.1	25.4	0.415	4.50	5.85	.435
3	63.2	13.7	54.0	22.9	0.427	4.64	5.22	.471
4	64.4	13.2	55.8	21.8	0.455	4.92	5.15	.489
5	68.6	9.3	63.6	14.3	0.590	6.39	3.77	.629
6	*Sunday.*							
7	73.1	10.2	68.3	15.0	0.687	7.37	4.56	.618
8	69.6	13.4	62.3	20.7	0.565	6.04	5.78	.511
9	68.8	13.6	61.3	21.1	0.545	5.86	5.75	.505
10	67.6	15.9	58.2	25.3	0.492	5.28	6.72	.440
11	65.9	14.2	57.1	23.0	0.475	5.11	5.73	.471
12	66.9	12.9	59.3	20.5	0.511	5.50	5.25	.512
13	*Sunday.*							
14	74.7	10.5	70.0	15.2	0.727	7.76	4.85	.615
15	70.4	13.2	63.5	20.1	0.587	6.29	5.74	.523
16	68.3	14.0	60.4	21.9	0.529	5.69	5.89	.491
17	67.6	15.3	58.6	24.3	0.499	5.35	6.44	.454
18	70.1	14.1	62.6	21.6	0.569	6.09	6.15	.498
19	71.6	13.2	65.0	19.8	0.616	6.60	5.86	.530
20	*Sunday.*							
21	74.5	9.7	70.2	14.0	0.731	7.82	4.42	.639
22	77.1	7.3	74.2	10.2	0.831	8.91	3.40	.724
23	76.8	8.9	73.2	12.5	0.805	8.59	4.21	.671
24	78.8	7.5	75.9	10.4	0.879	9.38	3.64	.720
25	*Good Friday.*							
26	76.6	9.3	72.8	13.1	0.794	8.48	4.39	.659
27	*Sunday.*							
28	78.9	5.5	76.8	7.6	0.905	9.67	2.64	.786
29	79.7	6.0	77.5	8.2	0.924	9.88	2.92	.772
30	79.9	6.0	77.7	8.2	0.930	9.94	2.93	.772
31	79.7	6.0	77.5	8.2	0.924	9.88	2.92	.772

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1853—*Continued.*

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
1	....	..	S. W. or N. E.	Scattered \i and _i till 10 A. M. cloudless till 2 P. M. Scattered \i till 8 P. M. cloudless afterwards.
2	....	..	N. W.	Cloudless or little \i or _i till 8 A. M. cloudless afterwards.
3	....	..	N. W. or W. or S. W.	Cloudless or scattered \i occasionally.
4	....	..	S. W. or W.	Cloudless till 6 A. M. scattered \i till 1 P. M. cloudless afterwards.
5	....	..	S. W. or calm.	Cloudless till 8 A. M. scattered ~i or _i till 3 P. M. and nearly cloudless afterwards.
6	*Sunday.*			
7	....	..	S. or S. W. or N. W. high S. wind at midnight.	Variable sky till 8 A. M. being cloudless or overcast. Cloudless till 3 P. M. all kinds of clouds afterwards.
8	....	..	S. E. or N. W. or S. W.	Cloudy till 6 A. M. scattered _i afterwards.
9	....	..	W. or S. W.	Scatd. _i till 5 P. M. overcast afterwards.
10	....	..	W. or S. W. or N. W. high W. wind at 2 P. M.	Overcast till 2 A. M. cloudless afterwards.
11	....	..	S. W. or N. W. or W.	Cloudless.
12	....	..	S. W.	Ditto.
13	*Sunday.*			[cloudless afterwards.
14	....	..	S. W. or calm, or N. W.	Cloudless till 2 A. M. overcast till 6 A. M.
15	....	..	Calm, N. W. or S. W.	Cloudless.
16	....	..	N. or S. W. or calm.	Ditto.
17	....	..	W. or S. W.	Ditto.
18	....	..	S. W. or W.	Ditto.
19	....	..	Ditto.	Ditto.
20	*Sunday.*			
21	....	..	S. or S. S. E.	Nearly cloudless.
22	....	..	S. occasionally blowing sharp.	Ditto.
23	....	..	S. or S. W.	Ditto.
24	....	..	S. blowing sharp 8 A. M. to 3 P. M. and high at 9 P. M.	Ditto.
25	*Good Friday.*			
26	....	..	S. blowing high at 3 A. M.	Cloudless till 7 A. M. scattered \i afterwards.
27	*Sunday.*			[wards.
28	....	..	S.	Cloudless till 5 A. M. scattered \i after-
29	....	..	S. constantly blowing sharp.	Scattered \i—overcast at 1 and 9 P. M.
30	....	..	Ditto.	Scattered \i—occasionally overcast.
31	....	..	S. blowing sharp before sunrise.	Cloudless and occasionally scattered _i.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1853.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer.			Mean Dry Bulb Thermometer.	Range of the Temperature.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.727	29.806	29.628	0.178	86.6	96.8	76.3	20.5
2	.673	.750	.593	.157	88.3	99.5	76.3	23.2
3	*Sunday.*							
4	.786	.865	.716	.149	86.1	95.0	76.8	18.2
5	.722	.794	.635	.159	86.6	96.0	78.4	17.6
6	.771	.867	.682	.185	83.6	94.6	77.5	17.1
7	.853	.932	.792	.140	80.5	90.5	68.2	22.3
8	.870	.960	.795	.165	83.6	94.0	72.5	21.5
9	.852	.933	.770	.163	85.2	95.3	73.8	21.5
10	*Sunday.*							
11	.813	.893	.732	.161	86.3	98.0	74.3	23.7
12	.747	.824	.655	.169	87.7	101.4	75.0	26.4
13	.683	.747	.600	.147	89.8	102.8	77.4	25.4
14	.708	.803	.648	.155	89.2	99.2	77.0	22.2
15	.756	.820	.699	.121	84.8	90.3	78.4	11.9
16	.778	.873	.712	.161	85.5	95.5	65.0	30.5
17	*Sunday.*							
18	.783	.873	.706	.167	87.3	97.7	76.8	20.9
19	.731	.805	.653	.152	87.8	99.6	77.0	22.6
20	.734	.837	.632	.205	86.8	98.4	77.5	20.9
21	.777	.842	.681	.161	84.0	94.6	74.0	20.6
22	.730	.793	.644	.149	88.2	99.6	74.0	25.6
23	.722	.797	.612	.185	88.7	99.5	72.3	27.2
24	*Sunday.*							
25	.738	.814	.681	.133	84.1	93.0	73.2	19.8
26	.742	.811	.678	.133	87.1	98.0	76.5	21.5
27	.714	.785	.626	.159	87.6	98.7	76.6	22.1
28	.652	.725	.567	.158	88.5	98.1	78.0	20.1
29	.624	.695	.551	.144	89.6	100.0	79.2	20.8
30	.605	.684	.515	.169	90.6	103.0	80.1	22.9

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1853.—(Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	79.0	7.6	76 1	10.5	0.884	9.42	3.72	0.717
2	78.5	9.8	74.7	13.6	0.845	8.97	4.83	.650
3	*Sunday.*							
4	79.9	6.2	77.6	8.5	0.928	9.89	3.06	.764
5	80.0	6.6	77.6	9.0	0.927	9.89	3.25	.753
6	77.1	6.5	74.5	9.1	0.840	9.01	3.02	.749
7	72.6	7.9	68.9	11.6	0.701	7.55	3.43	.688
8	75.9	7.7	72.7	10.9	0.792	8.49	3.54	.706
9	76.6	8.6	73.1	12.1	0.802	8.58	4.03	.680
10	*Sunday.*							
11	77.4	8.9	73.8	12.5	0.822	8.75	4.27	.672
12	77.4	10.3	73.2	14.5	0.806	8 56	5.00	.631
13	77.6	12.2	72.7	17.1	0.791	8.38	6.04	.581
14	74.9	14.3	68.4	20.8	0.690	7.30	6.86	.516
15	74.8	10.0	70.4	14.4	0.736	7.87	4.59	.632
16	74.7	10.8	69.9	15.6	0.724	7.72	5.00	.607
17	*Sunday.*							
18	77.2	10.1	73.1	14.2	0.802	8.54	4.87	.637
19	78.8	9.0	75.3	12.5	0.863	9.16	4.44	.674
20	78.0	8.8	74.5	12.3	0.841	8.96	4.25	.678
21	75.4	8.6	71.7	12.3	0.768	8.23	3.94	.676
22	77.6	10.6	73.3	14.9	0.809	8.57	5.19	.623
23	79.0	9.7	75.3	13.4	0.861	9.16	4.80	.656
24	*Sunday.*							
25	75.5	8.6	71.8	12.3	0.771	8.25	3.96	.676
26	78.1	9.0	74.6	12.5	0.842	8.96	4.37	.672
27	79.2	8.4	76.0	11.6	0.881	9.37	4.15	.693
28	80.5	8.0	77.6	10.9	0.927	9.85	4.03	.710
29	82.0	7.6	79.4	10.2	0.982	10.41	3.92	.726
30	81.8	8.8	78.7	11.9	0.961	10.16	4.60	.688

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1853—(Continued.)

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		[7 P. M. cloudless afterwards.
1	....	..	S. and high at 7 P. M.	Cloudless till 4 A. M. scattered _ i till
2	....	..	S. W. or S. E. or S.	Cloudless till 6 A. M. scattered _ i till
3	*Sunday.*			5 P. M. cloudless afterwards.
4	....	..	S. or S. E.	Cloudless till 5 A. M. overcast till 1 P. M. cloudless till 6 P. M. cloudy afterwards.
5	....	..	S. or S. E. and blowing high at midnight.	Cloudy. [or overcast afterwards.
6	....	..	S. E. or S.	Nearly cloudless till 8 A. M. scattered ∩ i
7	101.5	..	E. or S. E. or N. E. blowing high at midnight.	Overcast till 9 A. M. scattered \ i and ∩ i till 7 P. M. cloudless afterwards. [8 P. M. cloudless afterwards.
8	107.0	..	S. E. or S.	Cloudless till 6 A. M. scattered ∩ i till
9	114.5	..	S. or S. E.	Cloudless till 3 A. M. scattered \ i or _ i till 2 P. M. ∩ i till 7 P. M. cloudless afterwards.
10	*Sunday.*			[3 P. M. nearly cloudless afterwards.
11	118.4	..	S.	Cloudless till 4 A. M. scattered \ i till
12	122.0	..	S.	Cloudless till 4 P. M. scattered \ i till 7 P. M. cloudless afterwards.
13	122.0	0.20	E. or S. W.	Scattered _ i or overcast.
14	124.2	..	S. W. or N. W. or S. E.	Scattered _ i till 2 A. M. cloudless till 8 A. M. all kinds of clouds afterwards.
15	....	..	Calm. [or S.	Cloudy. [afterwards.
16	107.8	..	W. or N. W. or S. W.	Cloudy till 4 A. M. all kinds of clouds
17	*Sunday.*			[cloudless afterwards.
18	112.8	..	S. W. or S. E. or S.	Cloudless till 10 A. M. ∩ i or \ i till 7 P. M.
19	118.0	..	S.	Overcast at 3 A. M cloudless till 11 A. M. scattered ∩ i till 5 P. M. cloudless or thin clouds afterwards. [afterwards.
20	115.0	..	S.	Cloudless 11 A. M. scattered _ i or cloudy
21	115.0	..	S. or S. E. or S. W.	Overcast till 10 A. M. scattered ∩ i afterwards with thunder and lightning.
22	122.2	..	S. or S. E.	Cloudy or \ i till 7 A. M. cloudless till noon, scattered ∩ i afterwards.
23	....	..	Ditto.	Cloudless till 7 A. M. scattered ∩ i or cloudy afterwards.
24	*Sunday.*	..	.....	About 2 P M. a heavy shower of hailstone and rain with much lightning (forked) and thunder.
25	120.6	0.80	S. or S. W. or S. E.	Cloudy.
26	124.4	..	S. or S. S. E. or S. S. W.	Scattered ∩ i or cloudy till 6 P. M. cloudless afterwards.
27	117.0	..	S. or S. E.	Nearly cloudless. [afterwards.
28	121.0	..	Ditto.	Cloudless till 3 A. M. scattered _ i or ∩ i
29	116.0	..	S.	Nearly cloudless.
30	127.0	..	S.	Cloudless till 7 A. M. scattered _ i till 5 P. M. nearly cloudless afterwards.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1853.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

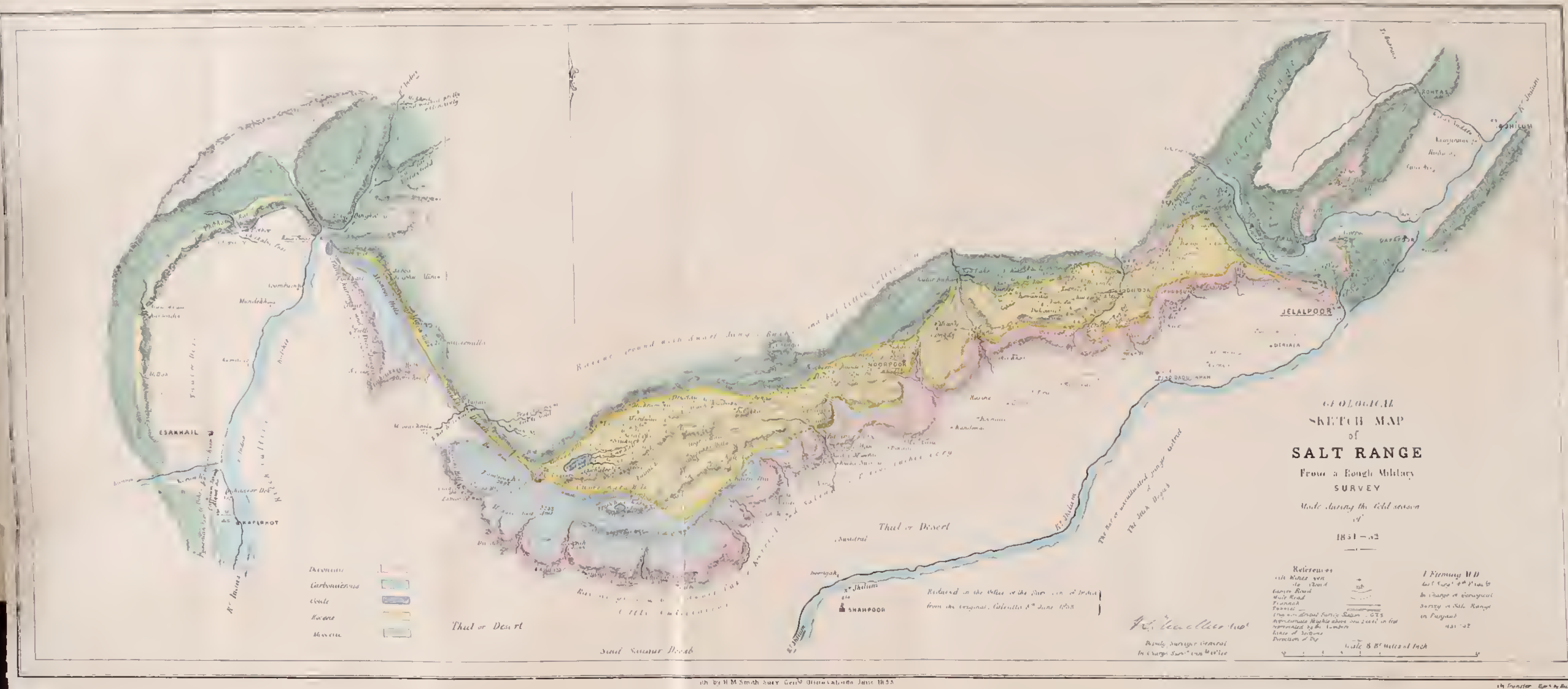
Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer.			Mean Dry Bulb Thermometer.	Range of the Temperature.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	*Sunday.*							
2	29.668	29.746	29.610	0.136	90.1	102.0	80.5	21.5
3	.662	.736	.599	.137	89.5	97.5	81.5	16.0
4	.600	.677	.520	.157	89.7	99.6	80.9	18.7
5	.607	.686	.531	.155	88.4	96.0	80.8	15.2
6	.658	.724	.595	.129	89.3	99.5	80.8	18.7
7	.756	.839	.682	.157	89.3	99.4	80.2	19.2
8	*Sunday.*							
9	.679	.743	.544	.199	88.9	99.9	74.6	25.3
10	.702	.771	.637	.134	86.7	97.4	76.9	20.5
11	.728	.848	.580	.268	84.8	95.5	75.8	19.7
12	.670	.741	.604	.137	84.3	94.5	70 4	24.1
13	.653	.723	.581	.142	85.2	94.5	74.0	20.5
14	.625	.679	.547	.132	89.7	98.5	78.5	20.0
15	*Sunday.*							
16	.652	.721	.565	.156	91.3	101.4	80.9	20.5
17	.699	.788	.633	.155	91.0	101.2	78.9	22.3
18	.690	.769	.606	.163	92.0	101.3	81.5	19.8
19	.658	.729	.585	.144	91.3	102.7	78.7	24.0
20	.663	.723	.595	.128	91.2	101.0	81.0	20.0
21	.697	.749	.652	.097	90.7	101.2	..	..
22	*Sunday.*							
23	.714	.785	.632	.153	91.6	103.0	81.5	21.5
24	.716	.789	.624	.165	91.8	102.6	81.3	21.3
25	.682	.774	.578	.196	91.0	101.2	82.4	18.8
26	.606	.684	.520	.164	90.4	99.6	80.3	19.3
27	.587	.665	.481	.184	89.5	99.8	81.2	18 6
28	.649	.796	.578	.218	84.3	97.5	75.6	21.9
29	*Sunday.*							
30	.686	.775	.585	.190	85.8	95.2	74.5	20.7
31	.655	.719	.562	.157	87.4	96.3	74 0	22.3

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1853—*(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	*Sunday.*							
2	82.2	7.9	79.4	10.7	0.984	10.39	4.15	0.715
3	82.0	7.5	79.4	10.1	0.983	10.41	3.88	.728
4	82.6	7.1	80.2	9.5	1.007	10.66	3.71	.742
5	82.1	6.3	79.9	8.5	0.998	10.59	3.25	.765
6	82.2	7.1	79.7	9.6	0.993	10.51	3.70	.740
7	81.9	7.4	79.3	10.0	0.979	10.38	3.83	.730
8	*Sunday.*							
9	76.9	12.0	71.9	17.0	0.773	8.19	5.85	.583
10	77.3	9.4	73.5	13.2	0.813	8.67	4.51	.658
11	77.3	7.5	74.3	10.5	0.835	8.92	3.54	.716
12	77.4	6.9	74.6	9.7	0.844	9.02	3.26	.735
13	80.2	5.0	78.4	6.8	0.952	10.17	2.44	.807
14	83.3	6.4	81.2	8.5	1.039	11.01	3.36	.766
15	*Sunday.*							
16	81.7	9.6	78.3	13.0	0.949	10.01	5.05	.665
17	76.2	14.8	69.7	21.3	0.720	7.60	7.33	.509
18	79.3	12.7	74.3	17.7	0.836	8.79	6.57	.572
19	80.2	11.1	76.0	15.3	0.883	9.31	5.75	.618
20	82.9	8.3	80.1	11.1	1.004	10.60	4.42	.706
21	83.6	7.1	81.2	9.5	1.041	10.99	3.81	.743
22	*Sunday.*							
23	82.6	9.0	79.5	12.1	0.986	10.40	4.79	.685
24	84.1	7.7	81.6	10.2	1.052	11.11	4.16	.728
25	81.1	9.9	77.5	13.5	0.926	9.76	5.17	.654
26	82.1	8.3	79.2	11 2	0.976	10.33	4.34	.704
27	82.0	7.5	79.4	10.1	0.983	10.41	3.88	.728
28	78.4	5.9	76.2	8.1	0.886	9.51	2.77	.774
29	*Sunday.*							
30	77.9	7.9	74.8	11.0	0 848	9.06	3.77	.706
31	79.8	7.6	77.0	10.4	0.909	9.69	3.76	.720

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1853—(Continued.)

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
1	*Sunday.*			
2	117.0	..	S. or S. E. occasionally blowing sharp.	Cloudy till 4 A. M. Cloudless afterwards. [wards.
3	115.0	..	Ditto.	Overcast till 6 A. M. nearly cloudless after-
4	116.0	..	Ditto.	Scattered clouds till 8 A. M. nearly cloudless afterwards.
5	113.0	..	Ditto.	Cloudless till 4 A. M. flying clouds or cloudy, lightning and thundering till 7 P. M. cloudless afterwards.
6	115.0	..	Ditto.	Flying clouds or scattered \ i or ∩ i or overcast till 7 P. M. cloudless afterwards.
7	115.0	..	S.	Cloudless till 8 A. M. flying clouds till
8	*Sunday.*			8 P. M. cloudless afterwards.
9	116.8	0.08	S. or S. S. W. or S. S. E. occasionally sharp.	Cloudy with rain and thunder till 9 A. M. cloudless till 4 P. M. cloudy with rain and thunder afterwards.
10	120.0	0.10	E. or S. or N. E.	Cloudy or overcast till 8 P. M. nearly cloudless afterwards.
11	113.4	..	S. E. or S. occasionally high.	Cloudless till 4 A. M. cloudy with rain and thunder afterwards.
12	118.3	0.96	S. E. or S.	Overcast or cloudy till 7 A. M. cloudless till noon, scattered _ i afterwards.
13	113.0	0.70	S. E. or S. occasionally sharp.	Cloudy with occasional rain, thunder and lightning. [7 P. M. cloudless afterwards.
14	125.0	..	S. or S. E.	Cloudless till 4 A. M. scattered clouds till
15	*Sunday.*			
16	124.0	..	S. E. or S.	Cloudless or patches of \ i or ∩ i.
17	124.0	..	S. E. or N. W.	Cloudless.
18	119.3	..	S. or S. W. or calm.	Ditto.
19	130.0	..	S. or S. W.	Cloudless or scattered \ i.
20	118.2	..	S. or S. E.	Nearly cloudless till 7 A. M. scattered ∩ i, or cloudy afterwards. [afterwards.
21	122.0	..	Ditto.	Nearly cloudless till noon, scattered clouds
22	*Sunday.*			
23	125.0	..	S.	Flying clouds till 7 A. M. cloudless till 1 P. M. cloudy with rain and thunder till 8 P. M. cloudless afterwards. [wards.
24	124.0	..	S. or S. E.	Nearly cloudless till 2 P. M. cloudy after-
25	126.4	..	Ditto.	Cloudy.
26	115.4	..	S. E. or S.	All kinds of clouds.
27	124.0	..	Ditto high at 5 P. M.	Cloudy and drizzling at 8 P. M. [zling.
28	119.0	0.50	S. E. or S. or E.	Cloudy or overcast with occasional driz-
29	*Sunday.*	0.08		
30	120.0	..	S. or S. W. or N. E.	Raining at midnight, and cloudy till 6 A. M. Scattered _ i or \ i till 8 P. M. cloudless afterwards.
31	125.0	..	Calm or S.	Cloudless till 2 A. M. scattered clouds, or cloudy or overcast afterwards.



GEOLOGICAL
SKETCH MAP
of
SALT RANGE
From a Rough Military
SURVEY
Made during the Cold season
of
1851 – 52
Carboniferous
Eocene
Thul or Desert
Thul or Desert
ESAKHAIL
NOORPOOR
JELALPOOR
SHAHPOOR
ROHTAS
JHILUM
PIND DADUN KHAN
DERIALA
R. Jhilum
Sind Saugur Doab